

**Dental**

**Abstracts**

*a selection of world dental literature*

AMERICAN DENTAL ASSOCIATION

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**Abstracts**

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AMERICAN DENTAL ASSOCIATION

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these  
purposes**

- 1. To present a selection of pertinent literature representative of all points of view within the profession;*
- 2. To provide, by a few hours' reading each month, a survey of the significant advances being made by dentistry throughout the world, as reflected in current dental literature; and*
- 3. To supply enough data in each abstract so that the reader may determine whether he wishes to refer to the original article for more complete information.*

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*The abstracts are grouped in broad classifications. The specialist will learn from this periodical of work done in other fields as well as in his own. The general practitioner will be able to keep abreast of modern knowledge in the various specialties. Articles from which abstracts have been made are on file in the Library of the American Dental Association and may be borrowed by members of the Association. Requests for articles should be addressed to the Bureau of Library and Indexing Service, American Dental Association, 222 East Superior Street, Chicago 11, Illinois. Only three articles may be borrowed at one time, and they may not be kept longer than one week. No charge is made to Association members for this service.*



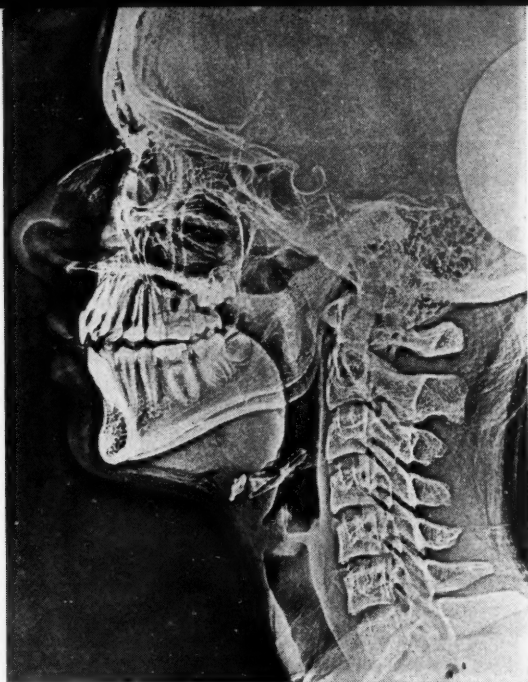


Figure 1 Wide variety of structures revealed in skull by xeroradiography

Oral surgery



Roentgenology

## The G-E civil disaster x-ray unit

General Electric Co. press release Jan. 1956

The General Electric Co. has developed a civil disaster x-ray unit capable of sustained operation even though cut off completely from outside supplies and power. The portable unit is carried in a trailer, and is designed to be assembled by relatively untrained persons. Included in the kit are control equipment, an examination table and tube stand, a protective screen for the operator, reusable "xeroradiographic" plates, dry-processing equipment for developing and resensitizing these plates, viewing equipment, and a motor-generator to supply both 230-volt and 115-volt electric power for all components. Assembly of the components is facilitated by color-coded electric plugs.

## Oral surgery 323

The method, called "xeroradiography," uses, instead of conventional x-ray film, an electrically charged metal plate which loses its charge at every spot where the roentgen rays strike it. After the plate is exposed, fine powder is dusted across it and clings only to the still-charged areas, to

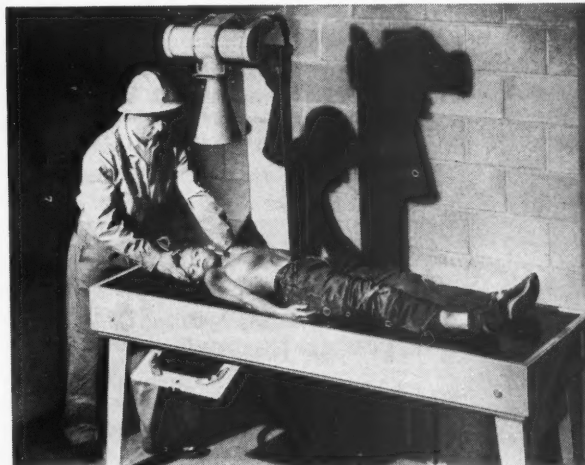


Figure 2 Disaster victim positioned for picture

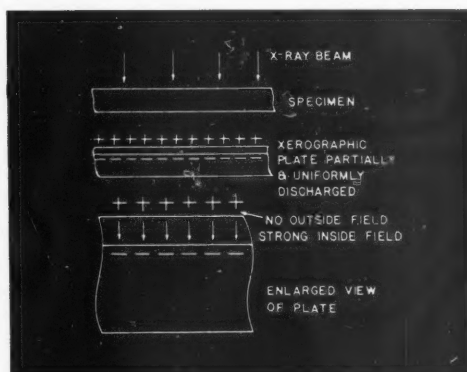


Figure 3 Principle of xeroradiography

produce a subtly shaded picture. Xeroradiograph machines are compact, easily transported and simple to operate. Plates have a roentgenographic area of 8½ by 12½ inches. Normal plate developing time is 60 seconds. The image can be transferred to pressure-sensitive paper for permanent recording.

Xeroradiography makes it possible to produce an image which, on one exposure, encompasses a wide range of densities ranging from soft tissue to bone, and the intermediate densities. The image can be produced in less than one minute, without the use of wet chemicals, water or drying equipment.

**Some ideas concerning the biologic action of roentgen rays** (Algunos conceptos sobre la acción biológica de los rayos roentgen)

T. González Castañeda. *Rev.dent. Chile*  
45:651-656 May-June 1955

The biologic action of roentgen ray radiation varies depending on the degree of radiosensitivity of the irradiated tissues and on the quality and quantity of radiations. The skin and the hematopoietic organs are the structures of greatest radiosensitivity. Lethal effects and the acute radiopathic syndrome are produced by absorption of massive doses of primary rays during only one exposure of the individual. At the present time they are rare, and they occur only as a result of atomic explosions, either in war or in accidents in laboratories of atomic experimentation.

Chronic radiation lesions are produced by absorption of small doses of radiations, mostly secondary, during repeated exposures of the individual. They are frequent in roentgenologists. The skin lesions consist of alopecia, acute radiodermatitis, injury to the fingernails, progressive dermatosis, keratosis on the knuckles and on the interdigital folds, and ulcers that can be either chronic or become cancerous. Chronic radiation lesions in the hands and cancer in the hands are frequent in dental roentgenologists.

The blood changes produced by repeated absorption of small doses of radiations are similar to those which occur in instances of acute lesions, but they take place slowly. The typical response

of the blood consists in an increase of circulating monocytes.

The radiations used in dental roentgenology are of little penetration and the times of exposure are short. Because of these features, often only the elementary routine precautions are followed. Dental roentgenologists no longer hold with their hands the film in the patient's mouth nor do they move in front of the radiation beam. Precautions against environmental radiations are emphasized.

Acute radiodermatitis occurring as a result of absorption of dispersed radiation in the environment in personnel that have been engaged in roentgenologic work for years has been reported in the literature. The period of latency between the absorption of environmental radiations and the appearance of chronic lesions varied between 4 and 14 years. Canceration of radiation lesions occurred in a high percentage of cases at a period which varied between 1 and 11 years after the appearance of dermatosis.

In the roentgenology departments of several hospitals, including the Bispebjerg of Copenhagen, as well as in the plants of atomic energy research, the quantity of dispersed radiations in the environment is measured daily. The daily maximal dose of environmental radiations that can be tolerated is 10 milliroentgens. If the absorption on the part of the personnel exceeds the maximal figure, the workers stop working for one or two weeks in that environment. Work is resumed after this period, provided better control of environmental radiations has been secured.

**The roentgenographic appearance of the lower third molar in situ compared with the extracted tooth** (Den retinerade visdomstandens rotanatomi på röntgenbilden och i verkligheten)

K. Bøseglin. *Svensk tandläk. Tskr.* 48:387-396  
Nov. 1955

At the Royal Dental School at Malmö, Sweden, impacted lower third molars are removed only after roentgenographic examination consisting of a standard periapical exposure, an occlusal view at right angle to the former, and an extraoral lateral oblique mandibular exposure. Film holders

are used for most intraoral films. This study is an attempt to evaluate how accurately the anatomy of third molars may be determined on the basis of such roentgenographic records, and, also, to evaluate the significance of special training in roentgenographic diagnosis.

One hundred impacted third molars were selected from patients in the surgery department. All teeth had complete roentgenographic records as described and were removed in one piece. Three operators with varying degrees of experience in roentgenographic diagnosis examined the films and diagnosed the number and shape of the roots of each tooth using a table with various choices for description of number, direction, shape and bending of the individual roots. Forty-six per cent of all instances were wrongly diagnosed by all three examiners. One of the examiners who had had several years of special experience obtained much more accurate results than another who was a dentist with no special roentgenographic experience.

The largest source of error involved teeth with two root canals where it is often impossible to determine whether the roots are fused or not.

The significance of the large percentage of error is discussed and correlated with Winter's statement that it is not always possible to determine the form of the unerupted lower third molar.  
—G. Ryge

#### **A simplified technic for copying radiographs**

Seymour H. Yale and Ronald R. Fields.  
*M. Technicians Bul.* 7:32-35 Jan.-Feb. 1956

A simplified technic for duplicating roentgenograms for teaching purposes utilizes materials found in the average dental x-ray facility. A heavy 15 by 15 by 24 inch corrugated cardboard carton was prepared by cutting an 8 by 10 inch window in one of the small panels. One of the large panels was removed and discarded. The box was painted with black lacquer. The unit was turned so that the window faced upward. With a photoflood lamp screwed into the light socket, the lamp socket assembly was placed in the bottom of the unit.

Several masks of different sizes were cut from black art paper to accommodate various sizes of roentgenograms. Two pieces of 11 by 14 inch picture-frame glass were taped together with the mask lying between them. A sheet of clear acetate was secured to one end of the top piece of glass and the glass-mask-acetate assembly was placed over the window of the unit.

With the sheet of clear acetate laid back (as in turning the page of a book) the original roentgenograms were arranged within the confines of the mask. The acetate sheet was returned to its former position so that it covered the roentgenograms being copied. Under safelight illumination a sheet of unexposed 8 by 10 inch x-ray film was placed over the acetate sheet. The film was covered by a third piece of picture-frame glass. The photoflood lamp was turned on and the sheet film exposed for 10 seconds and then processed in the standard dental x-ray processing tank for 150 seconds at 68° F. The procedure was carried out in the darkroom. The copies are of acceptable quality for teaching purposes.

This process of copying can be described as contact printing on x-ray film by means of transmitted light. The process should be of value whenever copies of roentgenograms are needed for exhibits, clinics or distribution to a referring dentist or physician.

#### **Radiobiology in physiopathologic experiments on cancer**

(La radiobiologie comme méthode de travail en physiopathologie et en cancérologie expérimentale)

J. Maisin, H. Maisin, A. Dunjic and P. Maldague.  
*Bul. Schweiz. Akad. med. Wissensch.* 11:247-271  
Oct. 1955

Several instances were reported of severe burns caused by exposure of operators to roentgen rays. In experiments with rats, the sensitivity to roentgen rays, the mechanism of prophylactic defense and the reconstructive therapy were studied.

The best mechanical protection is obtained by a safety procedure guarding both the intestinal tract and the marrow of the bones.

Two different syndromes, following constant roentgen ray irradiation, were observed. The first

symptom complex usually appears in the digestive system immediately after roentgenization; the second set of symptoms occurs in the medulla of the bones a short time later. Both syndromes are accompanied by a characteristic loss of weight.

The digestive syndrome can be suppressed by injections of mercaptothylamine (MEA) in instances of an irradiation up to 850 roentgen units. This drug, however, suppresses only the medullary syndrome which appears after doses of less than 500 r. Mercaptothylamine increases the production of red blood corpuscles.

The medullary syndrome which occurs after higher doses or which remains unchanged after injection of mercaptothylamine can be suppressed by injections of homologous bone marrow.

The presence of homologous medullary cells is important to obtain the desired prophylaxis. The results obtained in the animal experiments, however, do not permit discarding the possibilities of other prophylactic factors.

The animals whose abdominal regions had been protected during irradiation showed less cancer frequency than those whose abdominal regions had been unprotected.

Mercaptothylamine apparently cannot prevent the appearance of cancer after constant irradiation with roentgen rays; its usefulness is in reconstructive therapy.

## ▼ Plantation

### **Transplantation of dental germs** (Über die Transplantation von Zahnkeimen)

W. Bejjdl and J. Weizenberg.  
*Wiener klin. Wschr.* 51:577-578 Aug. 1955

Reports in medical and dental literature reveal that tooth-forming tissues in animals grow after transplantation. The dental germ in its developmental stage is an entity, and until tooth eruption (or the time immediately preceding eruption) it is not connected with the other parts of the organism by arteries, veins or nerves.

Recent experiments with different species of rats were directed toward establishing whether dental germs originating in young animals can be transplanted into older animals of the same species. Also investigated were whether homeoplastic or heteroplastic transplantations are possible, and how intense the force of survival is in those transplanted dental germs. Other tests were directed toward distinguishing between the transplanted dental germs and the hard tissues of the oral cavity, and toward the degree of further development of these germs in the new environment. The dental germs were transplanted directly into the dental sacs of the older animals.

Roentgenograms revealed that the transplanted germs are connected almost immediately with the vascular system of the host animal. This enables the transplanted dental germs to survive and to develop hard tissues. New development of osseous tissue, tooth cementum and dentin is followed by a formation of tooth roots, and it seems certain that the implanted dental germ will not deviate from its natural developmental anatomy. The prerequisite for transplantation is that the germs be sufficiently provided with blood vessels and nerves.

The most favorable time for a successful transplantation of dental germs is the developmental period before formation of the hard tissues has occurred. In rats, this is approximately seven days after birth. In other species, this moment lies in the first third of the period between birth and tooth eruption.

After transplantation of dental germs, all hard substances—enamel, dentin and cementum—appear normal, and no difference between these tissues and those of normally erupted teeth can be observed. The pulp and the root canals also are normally provided with nerves, blood vessels and connective tissue. Form and size of cusps do not differ from those of naturally grown teeth.

Further examinations will reveal whether such transplantations of dental germs can be performed successfully in animals of a higher biologic scale, and whether it is possible to implant dental germs directly into empty alveolar sockets in man.

The autogenous transplantation of tooth buds seems physiologically sound. As yet, however, homogenous transplantation has always failed.

▼  
Surgical technics

**Correction of receding chin**

**by implantation: a new method**

(Korrektur des fliehenden Kinns durch  
Einlagerung des Implantats von einem  
endobukkalen Schleimhautausschnitt aus)

Marguerite A. Kavàn. *Fortschr.Kief.Ges.Chir.*  
1:220-221, 1955

Many patients with receding chins complain that their long noses injure their appearance. It is sometimes difficult to convince these persons that it is not the long nose but the short and underdeveloped chin that causes the displeasing facial line.

Other patients urgently demand plastic surgery in the belief that small chins indicate lack of principles, speech disability and indolence. Many such patients even develop inferiority complexes.



*Before surgery*

Plastic surgeons endeavor to operate so skillfully that no disfiguring scars occur or remain. Gillies and Dufourmentel introduced the technic of implanting membrane fragments from the region of the oral vestibule into the mandible. The method, however, has not proved satisfactory because the implanted fragments rarely become firmly attached and frequently perforate the mucous membrane.

A new technic, developed by the author, corrects receding chins by implantation. All esthetic and functional requirements are satisfied and there are no unfavorable effects.

Anesthesia is administered by intratracheal intubation with the tube passing through the oral cavity. An 8 to 10 mm. incision is made on both sides of the mandible in the region of the second bicuspids.

A chip bone graft from a section of the rib is taken with a specially constructed raspatory (Reiner). The reshaping of the chin is done after the implanted bone grafts have been united with



*After surgery and healing*

the neighboring tissues by no. 000 silk sutures. It is not necessary to sacrifice much mucosa or skin tissue. Even though the operation is performed under general anesthesia, it is advisable to infiltrate the mandible with a local anesthetic.

The healing of a bone graft implantation is controlled by the same biologic and mechanical prin-



ciples that function in the normal healing of fractures.

All fragments must be replaced in normal alignment and maintained in position rigidly so that the biologic sequence of repair will restore normal form and function to the bone.

To avoid hemorrhage, the utilization of hyaluronidase is recommended.

### **Gasserian gangliolysis for trigeminal neuralgia**

Henry G. Schwarz. *South.M.J.* 48:189-192  
Feb. 1955

There has been general agreement that interruption of sensory impulses between the periphery and pons of the trigeminal nerve effectively relieves severe paroxysmal pain in instances of trigeminal neuralgia, and the operation most commonly accepted has been partial or complete section of the sensory root of the trigeminal nerve.

Taarnhøj, in 1952, introduced an operation consisting of section of the dura overlying the petrous ridge, and "decompressing" of the sensory root, without division of any nerve fibers. Love modified the Taarnhøj procedure by substituting an extradural for the intradural temporal approach.

Recently, Taarnhøj and Love and Svien presented follow-up reports on their respective series of 76 and 100 patients. In the latter series, 58 of 100 patients were relieved of pain after the decompression operation. The duration of follow-up was 1 to 22 months. In Taarnhøj's group, of 43 patients with "typical trigeminal neuralgia," 33 obtained relief 3 to 27 months after the operation. Although the follow-up period is still short, the procedure does have the advantage of giving relief in a significant percentage of instances without the disadvantages of complete sensory loss.

In searching for another mechanism the present author thought that the gasserian ganglion itself might conceivably be the site of scarring or vascular changes as suggested by Schaltenbrand. This might predispose to painful episodes triggered by very light touch stimuli, in a manner analogous to post-herpetic pain or to scarring of a peripheral nerve. Freeing of the ganglion with in-

filtration of its substance with saline solution might be of value as it sometimes is in peripheral nerve lesions.

### **Operative Procedure**

A vertical incision is made in the low temporal region. Through a small opening in the squamous portion of the temporal bone, the dura is dissected away from the floor of the middle fossa. After coagulation and section of the middle meningeal artery, the dura is incised just behind the foramen ovale and dissected in a medial and backward direction, freely exposing the dorsal surface of the gasserian ganglion as far as the sensory root. The ganglion is then freed on its undersurface. In carrying out this part of the operation the ganglion is lifted up on a narrow spatula, it being usually necessary to use a sharp knife to cut one or two tough bands of fibrous tissue which anchor it to the ventral dura in Meckel's cavity. After the ganglion is freed, a fine hypodermic needle is inserted and saline solution is injected; visible ballooning of the ganglion results.

### **Results**

This operation has been performed in 13 patients. To avoid as much as possible the influence of suggestion, it is explained to the patient that the procedure is still on trial, and that, conversely, section of the sensory root has stood the test of time with persistent relief of pain. In the group of 13 patients who agreed to have this procedure performed, there were six men and seven women, whose ages ranged from 51 to 74 years.

Twelve patients had typical *tic douloureux*. One man complained of nocturnal episodes of pain in the right upper gingiva and temporal region. It was only after gangliolysis had been performed that history of typical psychomotor episodes was elicited, and it was in association with these that pain occurred. The operation had no effect on this patient.

Of the 12 patients with typical trigeminal neuralgia, nine have been entirely free of pain for from five to ten months after operation. Two patients have had recurrent intermittent pain, not severe enough to require section as yet. One patient had a mild recurrence of pain on his fourth

day and insisted on partial section of the sensory root, which was done five days after gangliolysis.

### Summary

Nine of 12 patients suffering from true trigeminal neuralgia have been relieved of pain after gasserian gangliolysis. The procedure consists of freeing the gasserian ganglion from its dural coverings and distending it with saline solution.—  
A. F. Baranoff

### A method of plastic reconstruction of cleft palate with tube pedicle closure of the nasobuccal fistula: report of case

(Eine Methode der plastischen Wiederherstellung in schwierigen Fällen von Gaumenspalten)

Patrick Clarkson, London. *Fortschr. Kief.Ges.Chir.* 1:100-102, 1955

The patient, an 18 year old boy, had been born with a major cleft of the upper lip and palate. The cleft of the lip was closed when the boy was three months old. Later, still in the patient's childhood, two attempts were made to close the cleft palate. The soft palate still remained too short in its anteroposterior diameter, and a fistula persisted. The patient spoke with a pronounced nasal tone, and when tired or under emotional stress, his speech was incomprehensible. An obturator covered the fistula. The left upper arch was caved in, and a severe malocclusion was present.

By use of Gillies' maxillary osteotomic method, the left maxilla was reduced and repaired by the tube pedicle technic. The tube pedicle was implanted from tissues around the lower neck. During surgery, the lip scar was reopened, the left buccal sulcus incised, and the left anterior surface of the pyriform fossa and the antrum exposed. The left half hard palate, anterior and posterior to the fistula, was divided. An incomplete osteotomy through the posterior antrum wall and the tuberosity was executed. The left upper alveolus was levered into proper occlusion. The secondary neck defect was closed.

A month later, the left lower end of the tube pedicle was divided. The mucosa was separated

from the hard palate and connected to the soft palate, which then could move to the posterior pharyngeal wall. The fistula also was closed by a tube pedicle hooked behind the anterior lip attachment. Primary healing at this junction of soft palate and tube pedicle occurred shortly.

Later, the anterior part of the tube pedicle was connected to the hard palate and alveolus, and the lip wound was reclosed. The present facial appearance now is acceptable.

The treatment of an old and severe lip and palate cleft, with a persistent fistula, malocclusion and a serious speech defect, was achieved by reduction of the maxillary alveolus by osteotomy, and the closure of the enlarged hard palate fistula by tube pedicle technic. The treatment, lasting more than nine months, resulted in greatly improved speech, correction of malocclusion and complete closure of lip and palate cleft and fistula with vital tissues.

### Surgery in facial traumatism (La chirurgie du traumatisme facial)

L. Levignac. *Rev. franç. odontostomat.* 2:897-903 July 1955

Maxillofacial surgery recently reached a turning point, and traumatology has imposed new methods and conceptions. Up to now, a large part of the beliefs concerning the etiology, pathology and symptomatology of traumatic occlusion has been only the result of unsubstantiated opinions, and, therefore, cannot stand up under an objective, scientific evaluation. In the dental literature, hardly any other topic in periodontics has received more attention than traumatic occlusion. It appears to be the general opinion that trauma is not the primary causative factor in periodontal diseases but an aggravating agent when different forms of these diseases already are present. The orthopedic and orthodontic treatments, however, remain essentially the same. Several typical instances, selected from everyday practice, seem to prove that even if classical methods still have their own specific values, new technics in surgery of facial traumatism should be tested.

In the treatment of traumatic occlusions, as distinct from that of war mutilations, the reparative

treatment usually is more constructive than pure orthodontic therapy. Correction of facial deformities is important, and, as reported in the recent dental literature, structural displacements and frequent loss of substance occur. These conditions should not be neglected even if they seem to affect only the facial appearance. In the presence of such a disfiguration, plastic surgery, and also psychosomatic therapy, should be applied.

With the recent changes in maxillofacial methods and conceptions, the reparative and orthodontic technics will make important and positive contributions in the treatment of facial traumatism and traumatic occlusions. Both methods are worthy of further scientific research and clarification.

#### **The management of cancer of the maxillary antrum**

Donald Raines and Arthur C. James.

*Surg., Gynec. & Obst.* 101:395-400 Oct. 1955

The therapeutic plan followed at the Ohio State University Medical Center, including technical details of the surgical and roentgenologic procedures employed, is presented. Sixteen patients with primary carcinoma of the antrum were seen from 1949 through 1953; 13 carcinomas were of the squamous cell type, one was a transitional cell type, one an epithelioma adenoides cysticum, and one an adenocarcinoma. This distribution corresponds to that found in other large series. The most common complaint encountered was pain. Other chief symptoms were swelling of the cheek, nasal obstruction and alveolar ridge ulceration. Early diagnosis of cancer of the antrum is seldom made. In most of the patients evidence of bony destruction was present by the time the patients were hospitalized. If such tumors could be discovered while they were still in the confines of the bony antrum, it would be comparatively easy to obtain a high percentage of curative results simply by resecting the maxilla.

The surgical treatment of tumors of the maxilla has become more radical in an effort to obtain a better survival rate. Total maxillectomy is advocated in preference to the lesser procedures. By this procedure removal of the tumor *in toto*

is more often accomplished as well as exposure of extensions of the tumor which might otherwise be overlooked. The involved tissue is removed without regard for cosmetic appearance. Involved adjacent structures are removed when feasible. Care is taken at the time of resection to note the location of residual or possible residual tumor. A mold of the cavity is made with dental plaster. After the mold hardens, radioactive seeds are implanted in those regions of the mold which are to come in contact with those regions on the walls of the surgical defect containing the residual tumor. The mold is applied easily through the defect in the palate. A tumor dose of 7,000 r usually is administered. The surgical defect is not a serious problem. Dental prostheses can be made to fill this gap so that speech and deglutition are not impaired. During the immediate postoperative period (usually six months), a sponge obturator forms an adequate temporary prosthesis. The defect remaining from orbital evisceration usually is covered with a gauze patch which may later be replaced with an appliance containing a false globe that attaches to an eyeglass frame.

#### **The growth of the head of an infant with mandibular micrognathia, glossoptosis and cleft palate following the Beverly Douglas operation**

Morrison D. Beers and Samuel Pruzansky.

*Plast. & Reconstruct. Surg.* 16:189-193

Sept. 1955

A case report of an infant with micrognathia, cleft palate, glossoptosis and severe cyanosis is presented. The Beverly Douglas operation, in which the tongue is sutured to the lower lip in order to maintain forward traction of the tongue, was executed on the second day of life as a life-saving procedure. Six cephalometric roentgenograms were taken from ten days to 15 months. This is the first reported cephalometric follow-up on an infant for whom this procedure was utilized. The growth increments in the pharyngeal airway and in the facial profile are analyzed. The serial records demonstrate the increasing adequacy of the airway and the improvement in the facial pro-



file. The pattern of neurocranial growth is consistent with that described for the normal subject. The anterior fontanelle closed progressively. The floor of the nose grew downward and forward in relation to the base of the skull. The mandible grew sufficiently to contain the tongue in its normal intraoral relationship. The growth pattern of the mandible in relation to the rest of the face contributed to a reduction in the recessiveness of the chin and to an improvement of the facial profile.

It is not suggested that the operation stimulates the growth of the mandible. The Beverly Douglas operation provides a proper metabolic climate in which the infant can survive, take nourishment and thrive. The natural resolution of the symptoms in this syndrome is the expression of the inherent and individual potential for growth. This operation is recommended as a valuable means of managing this pediatric problem.

#### **Acute mycotic stomatitis:**

#### **experiments with histotherapy**

(Szöveti terápiál szerzett tapasztalatok, különös tekintettel habitualis afták kezelésére)

György Kovács. *Fogorv.szemle* 12:353-356 Dec. 1955

Mycotic stomatitis (thrush) is caused by fungi of the type *Candida albicans*. Usually this disease is superimposed on debilitating conditions or chronic disorders. Lesions (aphthae) appear as white or light yellow, poorly defined and slightly elevated patches, a few millimeters in size, mainly in the oral cavity, infrequently in the esophagus, the bronchi and on different areas of the skin. When these patches are eliminated, the underlying tissue is dark red and several blood spots appear.

Microscopically, the aphthae are composed of mycelial threads, nonvital epithelium and leukocytes. The accompanying inflammation usually is light or moderate.

In 1951, the Dental Institute of the University of Budapest, Hungary, introduced histotherapy in the treatment of 179 patients of whom 102 had acute mycotic stomatitis and 70 intestinal moniliasis.

The treatment consisted of 716 implantations of animal placenta tissue. Among the 68 patients called back for examination, 16 showed no improvement, 25 a slight improvement, 18 a speedy recovery and 9 a complete cure.

During and after histotherapy, the secondary symptoms, such as arthralgias and cephalalgias, either decreased or disappeared in the majority of the patients treated.

#### **Subluxation of the temporo-mandibular joint: a new therapeutic method**

Stuart Gordon. *Plast. & Reconstruct.Surg.* 16:57-60 July 1955

A review of the literature suggesting various methods for the alleviation or cure of subluxation of the temporomandibular joint is presented. The therapeutic method in widest use (and always followed by success) is excision of the intra-articular cartilage. Although improvement results from such treatment, it does not follow that the early satisfactory result is permanent. Practically all the reported cases have a follow-up of less than two years. Rarely, in the author's experience, has excision been followed by "perfect and proper movement."

Removal of the disk is followed by a change in the axis of movement of the mandible. When the mouth is opened, there is almost always a deviation of the mandible toward the side operated on. With the shortened vertical height resulting from excision of the intra-articular cartilage, the molars on the affected side will occlude before those on the other side. This disturbance of the normal occlusion leads to trouble.

If, following the removal of the meniscus, something were put in its place to maintain the vertical height, these shortcomings would be remedied. The author had polyethylene caps made; once the cartilage is out, the cap is slipped over the condyle. A search has not uncovered a single recorded instance of malignancy developing in a human being as a result of a plastic resin having been buried in the tissue. Since polyethylene is not opaque to roentgen rays, a tiny metal bead is incorporated in each side of the cap. The operation is performed under general

anesthesia. Through a vertical incision in front of the ear, the joint is approached by blunt dissection. The joint is opened and the lower compartment identified. Into this is slipped the blade of a special retractor. Downward traction opens the joint to its fullest extent and facilitates the removal of the entire cartilage, also protecting the cartilage on the condyle. Early movement is encouraged after the operation. An excellent result has been obtained in each of seven patients so treated in 1954.

### ▼ Surgical pathology

#### Salivary fistulas (Speichelfisteln)

L. Lebourg and C. Crepy. *Deut.Zahnärztebl.* 9:788-789 Nov. 8, 1955

Fistulas in the region of the parotid gland or in its excretory duct (Stensen's duct), frequently are observed in dental practice.

Fresh (mainly traumatic) fistulas should be distinguished from recurring old fistulas.

Four case reports describe the etiopathology, prognosis and therapy of these deep ulcerations.

Case 1. A fistula in the excretory duct of the parotid gland of traumatic origin occurred after secondary tuberculosis. The primary center was established as a pulmonary growth, and healing was achieved by general therapy after obliteration of the ulcer.

Case 2. A salivary fistula appeared after an incision of a phlegmon in the parotid gland, and for a long time this condition defied all therapeutic attempts. Finally, treatment with antibiotics and sulfonamides in topical application obtained the desired result.

Case 3. After surgical treatment of a phlegmonous parotid gland, a chronic suppurating infection, latent since childhood, developed into several salivary fistulas. The most intensive treatment achieved temporary improvement; however, the purulent discharge did not subside. At present, the patient is receiving roentgen ray treatment.

Case 4. After an incision in the parotid gland the patient's weakened defense mechanism and the unusual virulence of the invading microorganisms permitted, instead of the less dangerous formation of salivary fistulas, the development of necrosis of the parotid gland. Only serum therapy followed by plastic surgery obtained a cure.

The recommended therapy for severe instances of salivary fistulas and related phenomena consists in stoppage of the glandular activity, extirpation of the auriculotemporal nerve, roentgenotherapy of the gland and the involved region, and ligation of the excretory duct.

Reparative therapy consists of suturing the healthy ends of the excretory duct and in forming a new orifice into the oral cavity.

#### Tetanus infection causing dysphagia: report of case

J. W. Stephenson and B. Blacklay. *J. Laryng. & Otol.* 69:496 July 1955

Dysphagia and trismus obviously touch the field of dentistry. In an instance of an established tetanic infection, the patient presented dysphagia as a first symptom. An examination of the salivary corpuscles of the hypopharynx produced no additional causative factors. After seven days, trismus appeared, and all trismic phenomena, such as motor disturbances of the trigeminal nerve and spasms of the masticatory muscles with difficulty in opening the mouth, were present in an additional two days. Under anesthesia and after medication with muscle relaxing drugs, an esophagoscopy was performed, but no indication of tumor or any other disease of the esophagus was revealed. After a few days, the spasm reached from the muscular apparatus of the mouth to the neck and the arms. The blood calcium level decreased to 5.2 mg. After comparably high doses of mephenesin (myanesin) were administered, all tetanic and collateral symptoms disappeared slowly. The opening portal of the provocative agent, however, was not discovered. Among 53 reports on tetanus infection published in recent years, dysphagia appeared in only nine instances as the first symptom. Because of its

eminent dangerousness, tetanus infection must be treated immediately. Whenever the etiology of dysphagia is not unequivocally determined, a tetanus infection should be suspected.

#### **Neuralgia of the buccinator nerve: diagnosis and therapy**

(Zur Diagnosen und Therapie der Neuralgia des Nervus buccalis)

H. Dhom. *Deut.zahnärztl.Zschr.* 10:1486-1491  
Nov. 15, 1955

In trigeminal neuralgia, the inflammatory involvement of only a single branch of the nerve seldom occurs. In instances of true neuralgia of the buccinator nerve, however, such unilateral involvement is the most significant symptom. The other phenomena resemble closely those of trigeminal neuralgia.

Whenever even the slightest palpation of the cheeks or the circumoral region induces intolerable pain, the presence of neuralgia of the buccinator nerve is indicated. Usually, this condition is accompanied by severe disturbances of the masticatory and speech system.

Previously, the treatment consisted of extraoral neurosurgery. This procedure now has historic interest only, having been replaced by other methods such as curative anesthesia with procaine or epinephrine (or their compounds and derivatives) and radium, antipyrine or alcohol injections. Attempts to deaden the inferior alveolar nerve by alcohol injection alone are not only difficult but dangerous. The intraoral surgical removal of the nerve or a portion of the involved branch is preferred. Such neurosurgery is a comparatively slight intervention.

Because the anatomic course of the buccinator nerve varies, regional (conduction) anesthesia is contraindicated.

To avoid errors in the differential diagnosis, the knowledge of the regional course and spread of the buccinator nerve is essential, and the evaluation of the isolated involvement important.

#### **Hereditary malposition of teeth simulating rhinoliths**

(Angeborene Dystopie eines Zahnes unter dem Bilde eines Rhinolithen)

H. Baum. *München.M.Wchnschr.* 97: 1239-1240  
Sept. 16, 1955

The patient, a 40 year old woman, suffered from an increasing restriction of the nasal respiration, which appeared after an influenza infection and a chronic catarrhal rhinitis. The rhinologyngologic examination revealed the presence of a typical nasal concretion (rhinolite).

The patient's previous history disclosed that in her early childhood, plastic surgery (in six stages) had been performed to correct cleft lip and palate.

During surgery which had been directed toward freeing the nasal breathing, two completely developed bicuspid were removed. Their crowns already had broken through the roof of the oral cavity and projected into the nasal cavity. These teeth were covered with an incrustated brownish stratum of calcic salt. They appeared to be two malposed bicuspids which had entered the nasal region by simultaneous rotation, and which simulated true rhinoliths.

In dental literature, a few instances have been reported of teeth penetrating the nasal cavity. These malposed teeth were either incisors or cuspids. The report of bicuspids in the nasal region, however, seems to be unique.

The appearance of teeth in such an abnormal or anomalous position as these so-called "nose teeth" may be explained either by hereditary factors or by atypical developmental processes which had occurred during the embryonal period. It also is possible that such a condition could be caused or be influenced by severe trauma.

It is difficult to determine whether these teeth were missing from the deciduous dentition or are supernumerary permanent teeth.

The opinion of several authors that the occurrence of malposed teeth could be induced by an early and sudden loss of deciduous teeth does not seem to be based on facts.

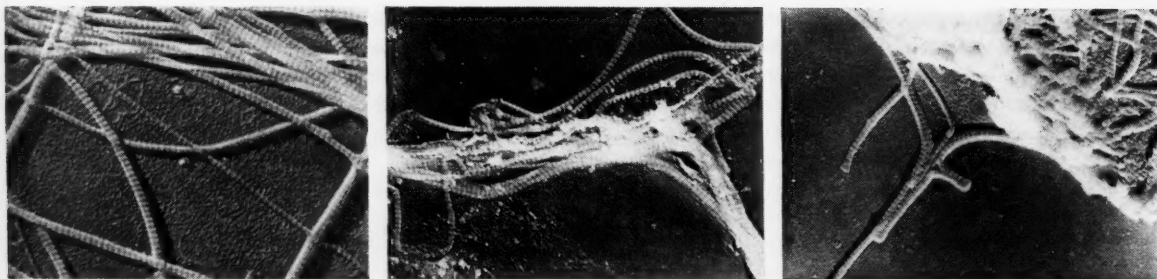


Figure 1 Left: Decalcified lamellar bone. Center: Parietal bone from human fetus. Right: Decalcified bone

#### Basic science



#### Histology

### The structure of osseous tissues as studied with the electron microscope

Antonio Ascenzi. *Sc.med.ital.* 4.:670-690  
April-June 1955

Although electron microscopy was introduced only a few years ago, research on the structure of osseous tissue with the electron microscope already has established a more direct and precise definition than could be obtained previously by examination with roentgen ray diffraction and polarized light microscopy.

The recent investigations, using the electron microscope, were basically concerned only with the analysis of the extracellular matrix of bones (ossein and inorganic components); therefore, the available information on cells and cellules still is inadequate. The knowledge obtained previously by conventional methods, however, proved valuable in the interpretation of electron microscopic findings. Recent examinations establish that the osseous extracellular matrix consists of a system of connective fibrous bundles embedded in amorphous calcified basic substances. In direct

microscopic studies, no crystalline structure could be detected. Histologists usually describe this amorphous basic substance as "molecular dispersion" or "diffuse deposition."

Osseous types can be differentiated by electron microscopy according to the pattern of fibrous bundles; for example, bones with interwoven fibers, with parallel fibers, and lamellar bones. Through electron microscopy, all the structural features of elementary fibrils are clearly distinguishable. In animal and human bones, the morphology of these fibrils is identical with that of the collagenic fibrils of the nonskeletal region (Randall, Fraser, Jackson, Martin and North, 1952).

The structure of cement substance and the inorganic fraction were examined with the electron microscope by Ascenzi and Benedetti in 1954, and by Ascenzi and Chiozzotto in 1955. The findings provide evidence that the osseous network belongs to the inorganic fraction, and the less dense osseous substances to the cement structure. Attempts have been made to analyze the nature and size of the inorganic network and of the micellar globules. The diminutive dimension of the cellular structures, which causes extreme photographic difficulties, has as yet prevented further progress. Nevertheless, it may be suggested that the micellar globules and the meshes of the three-dimensional network containing these globules are spherical, both belonging in the same size range, their diameters having been measured from 200 to 250 angstrom units.

Correlation of the data on the calcified cement substance obtained by electron microscopy with the data on osseous structures obtained by previous methods indicates that both the organic



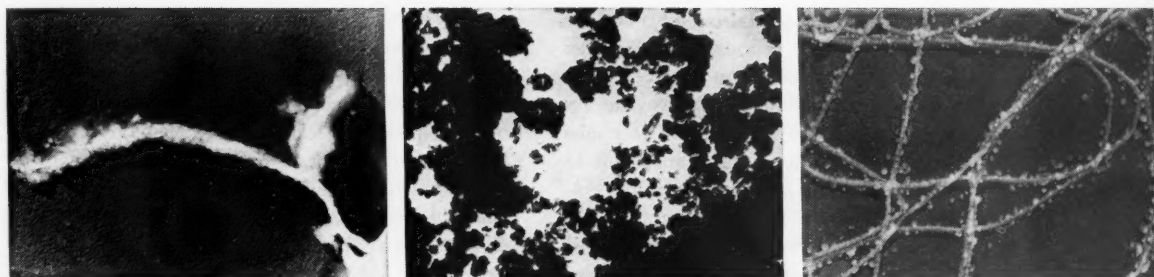


Figure 2 Left: Lamellar bone. Center: Bone stripped of ossein (Gabriel's method). Right: Parietal bone from human fetus

micellar globules and the receptacles can be considered to be submicroscopic entities ("composite bodies with rod-type arrangement") as reported by Wiener (1912). In bones in which the fossilization process has reached an advanced stage and the ossein has been completely destroyed, the inorganic component shows a reticulate, honeycomb-like structure with minute excavations (Ascenzi, 1949, and Barbour, 1950).

Day and Evans (1935) reported that the cement substance of interstitial connective tissue consists of thin membranes of minute fibrils surrounded by apparently structureless substances. The morphologic problem, whether crystalline structures can be visualized by electron microscopy, still remains unanswered. The process of crystallization of osseous hydroxyapatite does not proceed beyond the secondary developmental stage, but in tooth enamel it reaches the third stage, the crystals exhibiting a completely defined pattern. The crystallization of inorganic components, however, must be regarded as an unusually complicated process.

No satisfactory explanation has been reached regarding the relationship between the various components of the osseous extracellular matrix, especially the relation between collagenous fibrils and cement substance. When a fragment of the compact lamellar bone is agitated in a blender, and a specimen is examined later in the electron microscope, it will be established that collagenous fibrils act and react in various forms. Some are covered by a sheath, concealing their morphologic characteristics; others appear to be scattered within diminutive, irregularly distributed fragments of calcareous material.

In regard to the fibrils that are structurally associated with the inorganic components, three questions still are unanswered: (1) Is the inorganic component arranged around the fibrils in a definitive pattern? (2) Is it a prerequisite that the fibrils develop chemicostructural alterations to fit within the structural network and the inorganic component? (3) Are the calcium salts within the ossein matrix simply deposited around the collagenous fibrils, or do they actually penetrate these fibrils? It is too early to answer these fundamental questions by studies with the electron microscope.

#### **Hyaline bodies in the epithelium of dental cysts**

Martin A. Rushton. *Proc. Roy. Soc. Med.*  
48:407-409 May 1955

In nine instances in recent years, sections of dental or dentigerous cysts have been noted in which the lining epithelium contains peculiar solid bodies, usually in isolated patches. This represents about 4 per cent of the sections of such cysts examined. The specimens concerned were from both sexes, from patients between 38 and 79 years old, and from either jaw.

The bodies measure up to about 0.1 mm. long and have some characteristic shapes which may occur separately or together. One of these is linear, straight or curved into various figures, often in a double strip as if an oval had been completely flattened with a little granular material at its center, or like a hairpin. The bodies frequently

seem to have sustained several fractures and are clearly extremely brittle at some stage. Another appearance resembles broken-up pieces of plate. A third aspect is of circular or polycyclic agglomerations, sometimes laminated. The nuclei of epithelial cells are often in close apposition to their surfaces. The bodies occur only in the epithelium or on its surface and are irregularly distributed. A few particles lie close to the basal layer, but most lie away from this, and many are being shed into the cyst cavity. The extreme confusion of fragments often found and tears in the tissue may be partly connected with the collapse and contraction of the cyst wall when the fluid contents were released and the cyst wall was stripped out.

The linear forms may be found in the same pattern in several adjacent sections, so that they probably represent short sheets or flakes cut across and not rods. They appear to be the same as the plate forms but seen at a different angle. The circular or polycyclic bodies are bounded by one or more layers of this same clear material but their center is different and granular.

The clear material resembles in appearance and in liability to fractures the so-called "keratinized" layer of the epithelial attachment of a tooth. It is eosinophil, gram-negative, and gives a negative result with von Kossa's method for calcium and the periodic acid Schiff method for mucopolysaccharides. It gives a positive Prussian blue reaction varying from pale to strong, a diffuse coloration sometimes of different intensity in different layers of the same body. It also stains selectively with aldehyde fuchsin after oxidation with permanganate, and either faintly or strongly without. In one specimen which also showed an unerupted tooth, the clear material colored in the same manner as the secondary enamel cuticle, weakly before and strongly after oxidation, whereas other enamel cuticles and remnants of enamel matrix stained only after oxidation.

The other material concerned is that which is enclosed inside the layers of clear material in the polycyclic bodies. This is usually of a granular nature and retains most dyes but not aldehyde fuchsin and does not give the Prussian blue reaction. Similar masses could be found which had not become enclosed in a clear layer. It was thought they might represent masses of degen-

erating cellular material such as macrophages, which are present in abundance in the cyst walls and cavities. It appeared as if the clear layers had been deposited successively around a granular material previously existing, and that this may have been the result of contact with epithelial cells by which the material was surrounded, rather in the manner in which the secondary dental cuticle is applied to the cervical enamel and cementum.

If this is so, the linear and platelike bodies may represent the exercise of a similar function, possibly peculiar to epithelium of dental origin.—  
A. F. Baranoff



## Anatomy

### Some anatomic facts and fancies relative to the masticatory apparatus

Linden F. Edwards. *J. Pros. Den.* 5: 825-839  
Nov. 1955

Attention is called to some common errors and careless mistakes in biologic and anatomic terminology and concepts that appear in the dental literature. Authors should examine their statements critically for possible errors in anatomic and physiologic nomenclature and concepts, before submitting them for publication.

The term "anatomy" is often used erroneously as synonymous with structure. Anatomy is the science or study of the structure of the animal or human body; it is not synonymous with structure but rather is the study of structure.

The words "physiology" and "function" are not synonymous, and the expression "physiologic function" is redundant. Physiology is the science or study of functions of a living organism and its parts.

The word "tissue" is not synonymous with organ or with a structure or membrane such as the mucous membrane or mucosa which lines the oral cavity or covers the alveolar process or ridge. Histologists recognize only four main kinds of tissues; namely, epithelium, muscular, nervous and connective, and they ordinarily use the word

tissue only with reference to these. For the sake of scientific accuracy it is suggested that the term "oral mucous membrane" or "mucosa" be substituted for that of "oral tissues."

The expression "edentulous alveolus" is questionable. The singular form "maxilla" is used erroneously to indicate the upper jaw. The upper jaw is formed by a pair of maxillae which unite in the median plane at the intermaxillary and median palatal sutures. The terms "intermaxillary" and "bimaxillary" are still commonly used in place of the more modern and acceptable word "maxillomandibular" when referring to the space between the upper and lower edentulous ridges.

A questionable term is "denture teeth" used to indicate teeth of the artificial denture. The use of the adjectives "artificial" and "natural" would clarify the meaning.

Biologic misconcepts in dental literature include those which would assign purpose or intelligent planning to nature, in such a statement as, "The maxilla is designed by nature to absorb and dissipate pressure." Man is not endowed with the mental or psychic capacity to fathom the phenomena of nature to that extent.

Although many people believe that function determines form or structure, anatomists are inclined to the opposite view, namely, that the structure of an organ determines its function.

It is false to refer to the mylohyoid muscle as "the floor of the mouth"; if the mylohyoid muscle is to be called the floor of anything, it is that of the sublingual space. Equally false are references to the facial muscles of expression, particularly the buccinator muscle, as "accessory muscles of mastication." These muscles do not perform this function any more than do the muscles of the tongue. The muscles of mastication insert into and serve to move the mandible during the chewing process.

The need for clarity of expression is stressed in discussing such concepts as tissue fluid, the anatomic relations of the edentulous ridge, the structure of the temporomandibular joint, reflex and involuntary movements, and the role of the muscles during mandibular rest position.

There is a need for original research projects by qualified physiologists and physicists aimed at solving some of the biologic problems bearing on prosthetic dentistry.

## ▼ Physiology

### **A consideration of the physiological background of mandibular posture and movement**

C. F. Ballard. *D. Practitioner* 6:80-89  
Nov. 1955

Previous theories and concepts concerning the neuromotor behavior (function) of the orofacial soft tissues have not been sound and have been disproved by clinical analysis.

Research work on the evolution, embryology and development of behavior is reviewed, and the following hypotheses are suggested:

1. The mandible has a postural relationship to the maxilla which is endogenously determined, mature at birth, and probably remains stable throughout life.
2. There is a repertoire of patterns of activity of the muscles of mastication, likewise endogenous, used for mastication, speech, and so forth.
3. These hypotheses apply to the muscles of the tongue and muscles of facial expression.
4. The position of the dentoalveolar structures developing from the dental bases and their occlusal level is determined by the posture and activity of the orofacial and masticatory muscles.

Any adaptation of behavior to occlusal variations or changes of patterns of activity, theoretically required for correction of a malocclusion, must be by conscious control and prolonged practice, or by a reflex activity for which the physiologic mechanism is already present in the individual as a result of evolution.

The basic patterns of motor coordination arise within the central nervous system and are not the result of reflexly stimulated trial-and-error learning; they cannot be eliminated, but can be modified reflexly to form habit patterns which are not permanently learned but have to be reinforced continually.

These concepts are related to recent clinical observations. The hypotheses are of interest to the orthodontist, the prosthodontist and the periodontist.



## Pathology

### Occupational decalcification of the teeth by acid

*Med. Illus.* 10:61 Jan. 1956

Decalcification of the teeth by acid has proved a problem in a local chemical factory where an acid dust has been found which eats away the teeth of employees. An initial clinical examination showed that all the girls working in the room where the tartaric acid dust was found were affected to some degree. A control group working in another part of the factory showed no signs of the disease.

In an attempt to reproduce the observed disease *in vitro*, teeth were subjected to the action of tartaric acid over a range of concentrations of solution in water. The amount of decalcification was measured by chemical analysis.

### Geriatrics and gerodontics

Maury Massler. *New York J. Den.* 26:54-63 Feb. 1956

The geriatric patient has many oral complaints characteristic of aging tissues. It may be difficult to decide whether these complaints are the result of normal tissue changes, endocrine or nutritional deficiencies or are psychic in origin. Prosthetic failures in the aged are more often the result of tissue deficiencies than technical defects.

The clinical characteristics of aging, the deficiency states most often seen in the geriatric patient and the dental problems encountered in these patients are tabulated and described.

The oral tissues change as the patient ages. There is a wearing down of the teeth, the rate depending on the character of the occlusion, the muscular pattern and the abrasiveness of the diet.

But more important, the periodontal structures (the gingivae, the alveolar bone, periodontal membrane and probably also the cementum) un-

dergo typical fibrotic changes. The osteoblasts and fibroblasts repair the wear and tear of daily function less rapidly and less completely, with the result that as age advances, the periodontium becomes atrophic. Because the periodontium is subject to greater trauma and more injuries than other tissues, atrophy is seen earlier in these tissues than elsewhere. Most of the teeth lost during middle age are lost because of degenerative changes in the periodontium.

The attached gingivae lose their stippled appearance and become edematous and smooth. The buccal mucosa is dry, inelastic and often wrinkled. Most characteristic are the smooth atrophic tongue and angular cheilosis. Abnormal taste sensations and burning sensations are common and probably due to progressive atrophy of the taste buds. Clinical signs of vitamin B deficiency states are so common in the aged as to be regarded as "normal." The oral symptoms of vitamin B complex deficiencies (atrophic glossitis, glossodynia, angular cheilosis, cheilitis and so forth) are frequently considered to be the result of diminished vertical dimension and poor oral prostheses, when in fact the latter merely aggravates the clinical manifestations of the basic deficiency state. The clinical symptoms cited are greatly alleviated by massive doses of vitamin B complex.

The most common oral complaints in the aged result from the fact that the aged mucosa is friable and easily injured. Traumatic ulcers under new or even old dentures are a constant concern to the patient and the dentist. Eighty per cent of women in the postmenopausal period complain of abnormal taste and burning sensations in the mouth. These symptoms may be related to low estrogenic levels and vitamin B complex deficiencies. Other symptoms commonly found in the mouth of the aging patient are osteoporosis, alveolar bone resorption, rapid ridge resorption, delayed healing of extraction wounds, overgrowth of *Candida albicans*, and causalgia, manifested as pain in an edentulous region from which a painful tooth was extracted some years ago. Most of the gerodontic problems are encountered frequently and in a more severe form in women in the postmenopausal period.

In a series of more than 100 women in the postmenopausal period with oral complaints, it



was found that 60 per cent responded satisfactorily to dietary corrections and vitamin supplements, 35 per cent responded well to estrogenic therapy and 5 per cent required psychiatric help.

The gerodontist is in a position to reduce the number of prosthetic failures in the aging patient by understanding the physical, metabolic and endocrine changes that occur during this period, and the dietary and nutritional deficiencies and the emotional disturbances that characterize the aged.

#### Diagnostic limitations and potentialities in focal infection

(Grenzen und Möglichkeiten der Herddiagnostik)

A. Koelsch. *Schweiz.med.Wschr.* 85:799  
Aug. 13, 1955

Focal infections in the oral cavity affect the whole human organism. Infectious diseases, blood dyscrasias, and nutritional, endocrinous and developmental disturbances occurring in other parts of the body also influence conditions in the oral cavity. Alterations appearing in oral structures often are the primary symptoms of morbid processes in distant regions.

Dentistry should not be concerned with the treatment of oral diseases solely but should assist the diagnosis of general systemic conditions.

Several new tests are now available to aid in the diagnosis of focal infections. Among the best known are these: antistreptococcal test, histamine test, foci-antigen test, provocation therapy using ultrasonic waves, short-wave irradiation and electron microscopy. Conditions noted in such tests which help to establish the diagnosis of focal infections are the following: an increase in the number of lymphocytes with a significant number of atypical leukocytoid types; either an increasing number of heterophil antibodies or an already previously established abnormally large number of these antibodies such as amboceptors, agglutinins, antienzymes, antitoxins, bacteriolysins, cytotoxins, hemolysins, opsonins and precipitins.

The clinical observations, however, are often too diverse to serve as final criteria on which to establish the diagnosis.

#### Sickle cell anemia: report of four cases

(Die Sichelzellanämie: Bericht über vier selbstbeobachtete Fälle)

A. R. Stevens, Jr., and E. Gill. *Deut.med.Wschr.* 81:26-29 Jan. 6, 1956

Sickle cell anemia is characterized by the presence of erythrocytes of "S" hemoglobin, identifiable by a differential hemoglobin analysis. This disease is observed in Negroes almost exclusively.

The symptoms of sickle cell anemia vary greatly. There may be pain in the joints, extremities and abdomen; enlargement of liver, spleen and lymph glands; osteoporosis of the skull with peculiar vertical striation from the outer table, and ulceration. This disease is essentially hemolytic and varies considerably in degree. Blood cell examination reveals thin "target" cells and the peculiar sickle cells. In the early stage, the spleen is hyperemic, especially around the malpighian corpuscles. Shrinkage and siderofibrotic nodules appear later. Thrombosis may occur, caused by crystallization in erythrocytes containing the abnormal hemoglobin. The rigidity of the cells is increased and the vessels obstructed. The resistance to infection is decreased. The oral cavity and the respiratory organs are affected frequently.

In Europe, sickle cell anemia has been of academic interest only, until the appearance of negro soldiers in the American occupation forces.

The United States Hospital at Heidelberg, Germany, studied several patients with sickle cell anemia, and published reports of four cases.

Case 1. The patient, a 13 year old negro boy, had all the symptoms of sickle cell anemia, especially the characteristic changes of the red blood cells which acquired a sickle-like or crescent shape. After tonsillectomy which had been performed when the patient was six years old, these symptoms had occurred for the first time.

The patient's father, mother and brother also showed sickle cell development but appeared to be healthy.

The prolonged disease affected the patient's mental condition unfavorably.

Case 2. The patient, the 14 year old brother of the first patient, showed sickle cell development but no unfavorable effects. The boy seemed to be in perfect health and mentally was above average.

Case 3. The patient, a 36 year old negro soldier, complained that he suffered from severe pain in the oral cavity, the right lung, and from a constant high temperature. Swellings in different regions of the mouth and painful irritation in the throat were additional symptoms. Clinically, icterus castrensis gravis was established. The presence of anisocytosis of red blood corpuscles and some "target" cells was established but no sickle cell formation.

The primary diagnosis was sickle cell trait. Additional phenomena, occurring during the patient's hospitalization, however, revealed that sickle cell anemia was the correct diagnosis. A sudden attack of dyspnea necessitated the employment of an oxygen tent. This treatment obviously was beneficial in reducing the "clumping" of red blood cells.

Case 4. The patient, a 20 year old, married negro woman, had symptoms resembling those of elliptocytotic anemia. Two blood transfusions brought no improvement. Extirpation of the spleen was indicated, but the patient's permission to undergo such a major operation could not be obtained.

Blood tests revealed anisocytosis, poikilocytosis, "target" and sickle cells. Blood tests established an unusual sickle cell development in the erythrocytes. The influence of hypoxia in this development was demonstrated by infarcts of the spleen.

#### **Otorhinologic problems in children with cleft palate**

(Oto-rhinologiske problemer  
hos barn med ganespalte)

Sverre Quist Hansen. *Norske Tannlaegeforen. Tid.*  
65:283-291 Sept. 1955

There has been more concern with surgical techniques for children with cleft palates than there has been with the otorhinological problems of these children. Speech therapy has become increasingly important in the treatment of cleft palate, and this in turn has established the importance of otorhinologic diagnosis and treatment to improve or maintain good hearing. The investigation of Salatoff and Fraser confirms that middle ear dis-

eases and impaired hearing are common among children with cleft palate, whether operated on or not.

No child should be exposed to cleft palate surgery while infectious conditions prevail in the ears, the pharyngeal or nasal cavities or paranasal sinuses.

The cleft palate has a demonstrable influence on the function of the eustachian tube and the aeration of the middle ear.

When hyperplasia, infection, or middle ear complications exist, the pharyngeal tonsils should be removed before the palate is treated surgically.

Surgical removal of the palatine tonsils always causes retraction and formation of scar tissue. Often a deformation of the pharyngeal opening results; also, reduced function of the soft palate and the eustachian tube may result from fibrosis of the tensor veli palatini and levator veli palatini muscles, the pharyngopalatinus and the palatoglossus muscles. Other adverse results of palatine tonsillectomy are reported. The palatine tonsils should seldom be removed, and never without consulting the plastic surgeon and speech therapist.—G. Ryge

#### **Unrecognized sequelae of dental imbalance**

Eric Francis. *M.J. Australia* 42:4-6  
July 2, 1955

This article is a study of pain conditions appearing in the face, head and trunk. The pain is frequently referred to in medical terminology as "functional" pain, and the term "fibrosis" is commonly used when the pain occurs in the posterior aspect of the trunk. No organic cause for the pain has been found on medical examination, and no patient has been considered for treatment unless such examination has been made. The clinical evidence showed a common characteristic in all patients; namely, abnormal dental function. With the removal of this abnormality, the pain subsided completely (in 100 patients).

Patients who were treated for pain symptoms occurring in the posterior aspect of the trunk had the following types of pain: stiffness or aching in the muscles, occasionally with spasm; pain in the low part of the back, which might move down the

thigh with "sciatic" severity, or pass as far down as the back of the knees, becoming acute when the patient climbed stairs or arose from a chair; pain in the neck, often associated with occipital headache and crepitus in the joints; pain and stiffness of the trapezius muscle and in the shoulder girdle, with deltoid pain, often sharp, on lateral raising of the arm; tenderness on pressure of the seventh cervical vertebra and the tip of the shoulder, and the spread of pain down the arm, with stiffness of the fingers in the early morning. Headaches were present in a large proportion of patients. They varied in location, being frontal, occipital, and even temporal or at the vertex.

Patients with facial pain were numerous. These included patients who exhibited pain in and about the ear. Some complained of a burning pain extending along the face from the ear to the nose, others of infraorbital pain of a nagging type, or of supraorbital pain extending over the forehead to the vertex. Severe pain in the zygomatico-temporal region was frequent. Patients could often describe their own pain development, and usually, when the pain was of neuralgic intensity, a clear-cut history could be traced from the initial discomfort up to the stage when the paroxysmal attack arrived; that is, the neuralgic pain was the ultimate result of the lesser pains being allowed to develop unchecked.

The writer concludes, from his clinical observations, that dental imbalance is responsible for a large amount of distressing facial pain, which could have been checked at its inception, or at any stage short of the final switch to trigeminal neuralgia, by application of the treatment evolved from his work. Surgical treatment by section or decompression is available for the neuralgic state, but the cause is still unknown.

Beyond these particular symptoms pain in all three locations shows the following common characteristics: it is not associated with any disease or inflammation; it is worst on awakening or after rest; it does not interfere with sleep; the general health of the patient is otherwise unaffected; it is accentuated by emotional disturbance and flourishes in "hysterical soil"; it readily loses its response to drugs; it is changeable in location, long periods of relief often occurring between the positional changes, and, as the syndrome develops, it

occurs confusingly in all positions at the same time; finally, what is of importance to this article, medical examination reveals no organic cause for it. Clinical evidence, however, indicated that there was constantly present a further common characteristic not previously recognized; namely, abnormal function of dental mechanisms. With the removal of this abnormality and restoration of harmonious function to the mouth, the pain subsided completely.—A. F. Baranoff

### **Reticuloendotheliomas of the soft tissues of the oral cavity**

(Sui tumori del sistema reticolo-endoteliale delle parti molli della bocca)

F. Barboni and G. Quintarelli. *Ann. Stomat., Roma* 4:335-364 Sept.-Oct. 1955

The occurrence of reticuloendotheliomas, tumors of the reticuloendothelial system, is relatively rare, and the appearance of such neoplasms in the region of the soft tissues of the oral cavity is seldom reported in dental and medical literature.

Reticuloendotheliomas usually are highly malignant and deeply encapsulated, and recur frequently either in the form and place of the original neoplasms or as metastases, caused by cell transfer, after previous surgical removal.

At the Institute of Pathologic Anatomy of the University of Bologna, Italy, a systematic anatomico-clinical study on reticuloendotheliomas was made, in which a collection of bioptic and statistical material, macroscopic and microscopic findings, and previous and current case reports were used. The instances examined were classified according to histologic criteria. The majority consisted of the following groups: endotheliomas, reticulomas, reticuloplasmocytomas and true reticuloendotheliomas. The remaining tumors displayed mixed histologic characteristics.

After the study was completed, it was concluded that the collected material was not sufficient to allow an evaluation exact enough to be useful for differential diagnosis. The fundamental importance of the bioptic material, however, for use in the diagnostic orientation of physicians and dentists, and for their planning of the correct therapeutic interventions, is emphasized.



Figure 1 Left: Oval-shaped horizontal foramen in right mandibular rami. Right: Oval-shaped horizontal foramen in left mandibular rami

▼  
Anthropology

**Position and form  
of the mandibular foramen in the  
Krapina man**

(Lage und Form des Foramen  
mandibulare beim Krapinamenschen)

Juraj Kallay, Zagreb, Yugoslavia.  
*Österr.Zschr.Stomat.* 52:523-526 Oct. 1955

No reference can be found in the literature regarding the position and form of the mandibular foramen in Krapina man (a human species closely related to the Neanderthal man). Fossils of the Krapina man were excavated in a rock shelter in the vicinity of Krapina, Croatia, Yugoslavia.

These foramens are located nearer to the deep sigmoid notch on the upper edge of the mandibular ramus than they are in modern man. The sigmoid notch of the Krapina man is extremely shallow and varies between 10 and 12 mm.

(R. Martins) and 10 and 21 mm. (J. Kallay). The distance between the lower edge of the foramen and the lowest point of the sigmoid notch is from 20.5 to 24 mm. The position of these foramens depends on the length of the rami which usually is from 56 to 61 mm. The foramens are situated in the upper third of the rami between the sigmoid notch and the base.

In the recently excavated fossils of the "Ehringsdorf" child, and in a small number of children of modern man, these foramens are situated in the midsection of the rami.

The mandibular foramen of the Krapina man has two forms: either funnel-shaped, running from the upper posterior to the lower anterior region of the ramus, or oval-shaped, running in a horizontal direction. In the first form, the lingula mandibulae is fully developed, resembling that of the "Ehringsdorf" child or of the chimpanzee. In the second form, an upper projecting edge runs parallel to the posterior ridge of the ramus. This edge is incassated, horizontal, straight or (in a few instances) arched. No lingula mandibulae can be observed.

The sulcus mylohyoideus mandibulae either is connected directly with the foramen, or is interrupted at the edge of the oval foramen forming a canal which later appears as a sulcus. This form sometimes can be observed in modern man, but only when funnel-shaped foramens are present.





Figure 2 Funnel-shaped and oval-shaped horizontal foramens

How can the oval form of the mandibular foramen in Krapina man be explained? Analogous foramens are not found in modern man or in any species of the Anthropeidea.

The Krapina man was herbivorous by nature as indicated by the fact that he suffered from acute traumatic periodontosis which occurs mainly among vegetarians.

It is possible that the Krapina man, judging by the oval-shaped foramen, belongs to a family not too closely related to modern man, even though funnel-shaped foramens occur in both.

It is also possible that the fossils found at Krapina belong to two different species. The difference between the oval-shaped and the funnel-shaped foramens is so tremendous that it can be recognized even on superficial examination.



## Physics

### Training in the mechanics of dentistry (Utbildningen i odontologisk mekanik)

Gunnar Bergström. *Sveriges tandläk.förb.Tidn.*  
47:537-546 Oct. 1, 1955

Dentists' lack of knowledge of mechanics has caused serious mistakes and omissions. Some of the commonly discussed problems of the mechanics of the mandibular movements, as well as certain clinical-technical problems which call for solutions based on a knowledge of mechanics, can be cited as examples.

The mandibular movements are divided into finite and transitory movements. It is shown that the axis for the transitory movements continually changes in its relation to both the maxilla and the mandible and that changes occur with various combinations of the rotation and protrusion phases of the opening movement. Curves describing the movement of the axis may be constructed for various opening movements, but they are of no practical value since they do not permit an analysis of the actual movements. Similarly, the

effect of change of some factor, for example, the condylar inclination, should not be interpreted in terms of variations of some arbitrarily determined rotation axis curve.

Problems concerning the force distribution at various movements are discussed and a method is given for calculation of the force exerted by various muscles and groups of muscles, and of the force exerted on the joints. Changes in direction and location of muscle action at various contractions are discussed.

With the Frankfort plane as the reference plane and with consideration of the changes in inclination of the long axes of the teeth, it can be pointed out that a change in the inclination of the occlusal plane hardly causes any change in the inclination of the cusps. The inclination of the cusps and of the incisal path, however, is changed with respect to the occlusal plane and with respect to the teeth. Also, changes in the compensation curve hardly affect the cusp inclination with respect to the Frankfort plane, nor to the occlusal plane, but only with respect to the long axis of the teeth. Thielemann's equation and Hanau's five principal factors in the laws of articulation are at best incomplete.

The standard types of cavity preparations are criticized from the point of view of mechanical

laws. Sharp angles give rise to loci minoris resistantiae in teeth as well as in filling materials. In cast restorations the chance for nodules is largest at such points—where they are hardest to remove; also, an excess of cement will not escape easily when sharp edges are present. Rounded line angles and point angles are advocated but these can hardly be done with available dental burs. The construction of fissure burs with rounded ends and pear shaped burs is advocated to replace inverted cone burs and round burs. The shape of a cutting instrument should be determined by the material it is made of, as well as by the rotational speed. From this point of view it is amazing to see that most manufacturers of carbide burs still use the same profiles and shapes as for ordinary steel burs designed for slow cutting.—G. Ryge

▼  
Psychology

**Psychology and psychohygiene of the dentist**  
(Psychologie und Psychohygiene des Zahnarztes)

Heinrich Meng, *Psych.zahnärztl.Praxis*  
1:45-47, 1955

Only a man whose inner life is in a healthy balance is able to be an objective, self-controlled and considerate consultant and adviser to his patients. Two problems are in the foreground: (1) the constant psychic and mental professional dangers and the dentist's struggle against them, and (2) his intellectual capacity to cope with the normal and abnormal behavior of his patients.

Relatively often, neurotogenic disorders appear and cause severe changes in the professional person. Stage fright, writer's cramp, types of muscular tics or ocular spasms and other related phenomena accompany and sometimes even characterize certain professions.

Feelings of frustration (*Unlust*) which cannot be "abreacted" immediately and normally often lead to an obsessive-compulsive fear neurosis; sexual complications and hysteric preconditions often limit the dentist's "joy in his work."

Hot-tempered irritability and reasonless irasci-

bility may color the dentist's professional characteristics. Usually, these symptoms grow worse because of repeated feelings of displeasure caused by annoying events in daily practice. Self-analysis and constant self-control can overcome this professional handicap.

Braun and Binder emphasize that such irritating factors often produce reactions in which "great things spring from trifling causes." In such an atmosphere of depression, there can be no peace of mind in the dentist's office. An insignificant word or a trifling happening can lead to an explosion. The dentist's contacts with his family, assistants and patients are shattered easily. Full knowledge and recognition of the facts, self-insight, self-education and an intensive autogenetic training frequently will bring a speedy improvement. Self-therapy, however, can be successful only when the dentist is relatively free from neurosis and shows no (or only a few) psychopathic symptoms, and when his "germ of individual personality" still is intact.

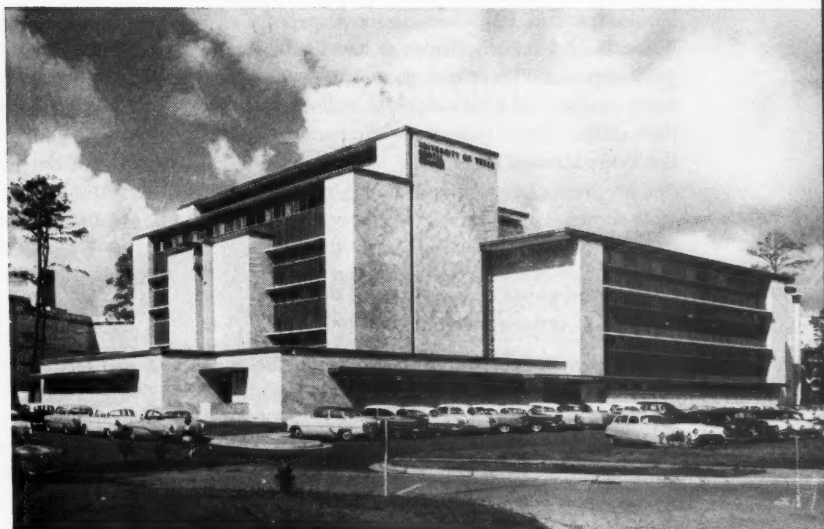
The relationship between dentist and patient must be based on what Freud called "mental transferability." This is the "transfer" of previous personal events and experiences from one person to the other, uniting both in an actual understanding. The patient, however, often is inclined to recall previous unpleasant experiences and may connect such recollections with the dentist and his work. He may picture the dentist as an image of his father, teacher or judge. Such reactions may have either positive or negative consequences. Mixtures of love and aversion (ambivalence) often produce disturbances to the same degree that the patient is neurotic. The dentist must always be aware that during pain-causing treatments, the patient feels helpless and his tendency toward a negative "transfer" may increase. Previous dental interventions, especially tooth extractions, may be related to complexes of mental trauma and castration. This has been revealed in various dream analyses, clinical observations of psychoses, and in the history of symbol interpretation.

In children, a refractory reaction often arises. The dentist must depend on his personality, experience and psychological knowledge, his "horse sense" and humor, to treat children (and adults with abnormal behavior patterns).

## Professional activities



## Education



## Today at the University of Texas

## Dental Branch

Thomas B. Leach. *Frater* 56:2-3 Nov. 1955

The University of Texas Dental Branch recently moved into its new \$5,500,000 Georgian marble building at the Texas Medical Center in Houston. The new building, constructed around the idea of individual working areas and instruction in small groups, is said to be the first dental school—indeed, the first educational institution—to be so designed.

In the five-story building there are 12 small conference rooms, two small lecture halls, and an auditorium seating 400 persons.

There are two main entrance lobbies—one facing west, for students, and the other facing east, for clinic patients. On the first floor to the east are the public lobby, and administration and business offices. At the west are the student lobby and a 100-seat lecture room. In between are rows of clinical bays, composed of individual cubicles for the senior students. In the center of these bays are student x-ray rooms, a student laboratory, a technicians' laboratory and a general dispensary.

The second, or "junior," floor, also has clinical bays flanking the laboratories, a darkroom, a 400-seat auditorium, a student lounge, a student library and the television studio.

On the third floor are two long rows of freshman laboratories—25 in all, each with working facilities for four students. Here the students do all their laboratory work and watch demonstrations over television sets. Flanking the student laboratories are the teachers' offices and laboratories. Teachers may televise any experiment or demonstration to students in their laboratories, and to auditoriums and lecture halls. The third floor also includes the pathology department, a small lecture hall, a faculty lounge, and laboratories for the School of Dental Hygiene, the first class of which is composed of 21 young women students.

The fourth, or "sophomore," floor is similar to the freshman floor. It has a television laboratory, and it also contains seminar rooms and a student store.

On the fifth floor are research facilities, animal quarters, isolation quarters, a kitchen, sterilizing room and isotope laboratory and two operating rooms.

The school began in 1905 as a proprietary dental college; in 1929 it became a philanthropic in-

stitution and in 1943 became the University of Texas Dental Branch. Today it has 48 full-time professors and 30 part-time men. The new building was designed by Fredrick C. Elliott, former dean of the Dental Branch and today director of the Texas Medical Center.

**Prediction of success in the first and second years of the study of dentistry on basis of certain selected variables**

Paul J. Blommers. *J.D.Educ.* 20:5-16 Jan. 1956

Whenever a college of dentistry has many more applicants for positions in its first year class than it has openings, its staff is faced with a problem of selection. The problem is to identify, from among all applicants, those who will become the best dentists. One solution has been to select those applicants who have achieved the best scholastic records in pre dental studies.

The American Dental Association has sponsored the development of two tests (a test of academic knowledge or aptitude, and a test of manual skill and dexterity as measured by a carving task) which it is hoped will be of supplemental value in selecting dental students. These two tests together with certain other measures are assessed as predictors of success in the study of dentistry.

The subjects of the study described consisted of the two groups of 54 and 51 students who made up the classes entering the College of Dentistry of the State University of Iowa, Iowa City, in 1952 and 1953, respectively.

In addition to pre dentistry grade-point averages, the following five variables were studied: the number of semester hours of science in excess of the minimum required for admission to dentistry; the total number of semester hours earned in pre dental study; the grade-point average for required pre dentistry science sources; the Association academic test score, and the Association carving test score. The basic criterion used was the grade-point average achieved during the first year of dentistry.

Neither the total number of semester hours of pre dentistry nor the over-all grade-point average achieved in all pre dentistry courses added

significantly to predictions of success based on the other four measures studied. A formula was derived for combining the remaining four measures into a single composite score which could be used as a basis for ranking applicants for purposes of selection. The validity coefficient for this formula was 0.61.

The carving test score was also found to make no significant contribution to the prediction. A prediction formula was derived which combined the semester hours' credit earned in science in excess of the required minimum, the grade-point average achieved in required pre dentistry science courses, and the Association academic test score. The validity coefficient for this formula as estimated by cross validation was 0.60. The use of the latter formula as a basis for selection could be expected to reduce by 5 per cent the number of students selected who would ultimately fail, when compared with selection procedures based only on pre dentistry academic records.

**Problems of recruitment of dental students**

O.M. Dresen. *Health* 13:13-15 Jan. 1956

The establishment of an effective recruiting program for qualified applicants to professional schools is as necessary as are high standards for admission and for graduation.

Each year approximately 70 dentists leave the dental profession in Wisconsin through death, retirement or other cause. Each year an equal number of graduates should replace those leaving the profession, plus a reasonable additional number to provide for a normal population increase.

The national average ratio of dentists to population is one dentist to every 1,670 persons; that of medicine is one physician to every 730 persons. The ratio of dentists to population in Wisconsin is one dentist to every 1,400 persons.

In the past year 665 persons applied for admission to the School of Dentistry of Marquette University in Milwaukee, Wis. Only 100 of those were from Wisconsin, of whom 73 qualified according to liberal admission standards and a display of aptitude for a professional career. In a total enrollment of 436 dental students, 284 are from Wisconsin, or an average of 71 to a class;



152 students are from 26 other states. In selecting students from states other than Wisconsin, preference at Marquette is given to applicants from the western states which have no dental school and where the need for dentists is often acute.

Marquette ranks fifth in enrollment among the nation's 43 dental schools. Marquette accepts 115 freshmen in its entering class each year. Whereas the school receives and processes more than 650 applications annually, the ratio of six applicants for each place available is not a true one, as most applicants apply to more than one school. The national average is two and a half applicants for each available place in a dental school.

Each year Marquette accepts 42 freshmen dental hygiene students. In 1955 the enrollment of the entering class was raised to 50. This is a two year course; a four year course leading to a degree is also available to the dental hygiene student. For the past three years, an eight week course in dental assisting has been offered during June and July. This course trains young women high school graduates to qualify as assistants in dental offices.

### Georgia Department of Public Health

*S.Carolina D.J.* 13:9 Jan. 1956

Georgia's dental students are being trained in helping those sick and injured as a result of such emergencies as bombing attacks, tornadoes, fires and floods. The Emory University School of Dentistry, with the help of the Georgia Department of Public Health, is seeking to produce dentists able to use their scientific training to provide medical care during emergencies. Senior dental students receive instruction in working in hospitals, treating bone injuries, giving injections of drugs and serums, and typing blood. Serving as instructors are dentists, physicians, public health engineers, chemists, hospital administrators and a veterinarian. The course includes lectures, films, demonstrations and field events.

Subjects include the following: the place of the dentist in civil defense; civil defense organization, responsibility and laws; the effect of atomic and fission-fusion bombs; the effect of chemical

and biologic warfare; principles of radiation; the use of detection devices; exercises in decontamination and the use of monitoring devices; first-aid stations, treatment centers and improvised hospitals; first aid for mass casualties; treatment of shock, contusions, lacerations, fractures, jaw and facial injury, chest wounds, abdominal wounds and radiation sickness; medical laboratory techniques and the use of blood plasma; transfusions and blood typing; emergency sanitation; emergency feeding and shelter; medical and dental care after an enemy attack; water problems; attacks on animals and crops in biologic warfare; management and treatment of mass hysteria and mental disorders during and after an attack, and the methods of carrying out General Order no. 13 for full civil defense mobilization.



### Dentistry in government

#### Dental facility planning

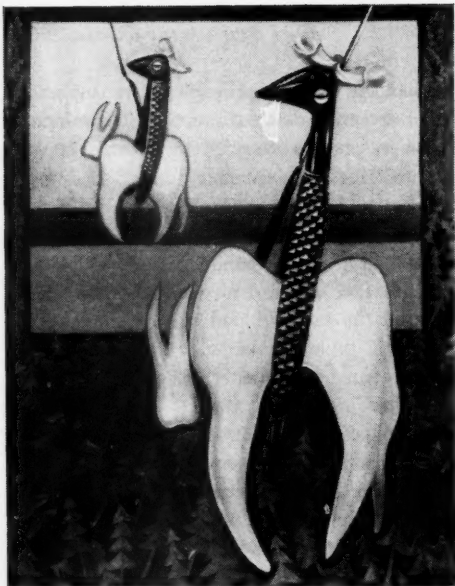
*U.S.Navy M.Newsletter* 27:28 Feb. 17, 1956

In the continental United States, there are 171 U.S. Navy dental facilities with 1,724 dental operating units installed and in use. Some 47 per cent, or 788 of these units, are concentrated in 21 facilities in the recruit training and fleet operating areas. The remaining 150 facilities are divided among smaller shore activities.

An additional ten mobile dental units are assigned to naval districts to care for military personnel in isolated areas and other small groups of military personnel without dental facilities.

Prosthetic dental treatment is provided at 73 of the 171 facilities and by one mobile dental unit.

The overseas shore base activities have 40 dental facilities with 207 dental operating units. Prosthetic dental treatment is provided in 29 of these facilities. There are 161 ships with dental facilities, with 305 dental operating units; 48 ships have dental prosthetic laboratories.



*Don Quixote*



*Dental still life*

▼  
Art

Editor's note: The first issue of *Dental Abstracts* contained six reproductions of "dental paintings" by a French dentist, David Solot, reproduced from the *Nederlands Tandartsenblad*. Because of the extensive interest aroused by Dr. Solot's work, *Dental Abstracts* presents three more examples of his art.

"Dental still life" and "Don Quixote" appeared in the November 1955 issue of *Hygie*. "The funeral of the tooth" appeared in the July 1955 issue of *Nederlands Tandartsenblad*.

*The funeral of a tooth*





### Auxiliary groups

#### Role of the dental hygienists in a private practice

Mae J. Sarsfield. *J. Am. D. Hygienists' A.* 30:7-13 Jan. 1956

The profession of dental hygienist is attracting women of intelligence and ability who desire work that is both financially compensating and psychologically satisfying. The health of teeth and their supporting tissues may be maintained indefinitely by the cooperative effort of the individual patient, the dentist and his dental hygienist.

A dentist's oral hygiene department requires efficient records. Through an efficient recall system, the dental hygienist may see patients at stated recall dates for prophylactic procedure and education. Patients may be notified for recall by the following means: appointment card with stated hour arranged; telephone; typewritten or printed letter, or a printed card form. The most effective means is the appointment card with the stated hour.

The appointment card plan is presented to the new patient at the time of her first visit to the office. Information relating to the patient and the time she prefers to receive prophylactic treatment can be incorporated on a 3 by 5 recall card. A master recall card, to be filed alphabetically, helps keep track of the recall card. If the dental hygienist or the dentist wishes to know when the patient is scheduled to return to the office, this information may be acquired in a few seconds from the master recall card. Patients wearing some type of prosthesis will benefit greatly from the recall routine, as will children undergoing topical fluoride treatment.

A birthday file of children to the age of 12 years helps provide a medium of maintaining close relations with them. The dental hygienist should also help the dentist to remember anniversaries, births, deaths, graduations and other events in the patients' lives. Patients are friends, and should be treated as friends.

A definite educational pattern should be followed at the chair. The patient should be greeted, congratulated for returning to the office when recalled, asked for any complaints, and the purpose of the patient's treatment should be reviewed.

Visual education is an asset in the oral hygiene department. Visual aids include dental journals, study models, typeodonts, manufactured visual aid models, complete-mouth roentgenograms, toothbrushes and written educational material for the expectant mother. The catalog of educational material issued by the American Dental Association lists various types of educational material for all age groups. A great aid in visual education is the hand mirror, by means of which the patient can follow the technic of the dental hygienist, and observe those areas which require future work by the dentist and those areas which need attention in home care.



### Miscellaneous

#### News of dentistry in U.S.S.R.

*F.D.I. News Letter* 13:6 Dec. 1955

In the U.S.S.R. dental services are provided under the Ministry of Public Health's program in the 8,000 medical institutions where more than 22,000 physicians, stomatologists and dentists are employed, and in the 7,000 provincial dispensaries staffed by 9,000 physicians, stomatologists and dentists.

Dental treatment is also made available to the populace by the 3,000 departments of the Ministry of Transport, Industrial Ministries and other departments which employ more than 8,000 physicians, stomatologists and dentists.

For dental treatment 1,900 beds are available in 95 independent stomatologic clinics and sections and in the surgical sections of hospitals. Dental treatment is provided free for patients in hospitals and polyclinics, and invalids and pensioners receive prosthetic treatment free as they do all other medical services. Between 70 and 75

per cent of those in the dental profession are women. In the towns one practitioner attends to from 3,000 to 3,500 adults and to 2,000 children from 4 to 16 years old.

Although the number of dental faculties in the U.S.S.R. is increasing rapidly, the number of dental schools is decreasing and the existing schools will soon be closed. There are two independent stomatologic institutes and 12 stomatologic faculties attached to medical institutes which admit 1,500 students and send out 1,400 students each year. The four remaining dental schools admit 240 students each year.

Applicants for dental courses must have graduated in ten subjects, and must take entrance examinations in physics, chemistry, Russian and one foreign language. The dental course in the Stomatologic Institutes and Faculties lasts five years.

There are scientific stomatological societies in all republics and provinces. A national grouping of these societies has been formed under the presidency of Professor A. Evdokimov. Stomatologists enjoy the same rights as all other physicians and have the same salary, from 800 to 1,100 rubles a month, depending on professional experience.

The basis of preventive measures is supervised oral hygiene of all school children and treatment of diseases of the deciduous teeth. A large scale study is being conducted on the long term results of fluoridation experiments carried out by J. Lukomski.

#### **The martyrdom of the dentist's hands**

(Die Marterqualen der Hände des Zahnarztes)

K. Bauer. *Dent. Echo* 25:76 Dec. 1956

The question, How long can my hands endure the constant strain, exertion and tension necessitated by daily practice? has been asked by many a dentist, and as yet no one has given a satisfactory answer.

The dentist's most important and irreplaceable instruments—his hands—from which patients expect relief from pain and preparation and maintenance of well-functioning dentures, are subject

to heavy daily toil. If hands could talk, they would report excruciating harm they frequently have to suffer. They have to endure not only the repeated indispensable washing process but the most strenuous, intensive and trying work, even if bleeding fissures and occupational inflammatory skin diseases make every movement of the fingers unbearable.

The frequent washing with water, soap and disinfectants and the daily contacts with materials such as cement, plaster, mercury, plastics, acids and anesthetics leave their marks on the dentist's hands. These and other chemicals required in dental practice damage the skin and deprive it of tissue fat. Fissures appear and permit incompatible substances to penetrate the epidermis; painful wounds and eczemas are the result; in extreme instances they make it a torture for the dentist to use his hands.

To counteract the injurious effects of those harmful substances, dentists now have at their disposal a recently developed pharmaceutical compound consisting of cholesterol, an emulsion of water in oil and an admixture of potassium sozoiodolate. Although containing no conspicuous perfume, this preparation has a pleasant aroma. Its effectiveness already has been tested clinically.

To obtain the optimal effect, a pea-size portion of this ointment should be rubbed or kneaded into the skin of the hand, after thorough cleaning. Especially effective is the application after office hours by slow massage, until the skin appears completely dry. This ointment is not greasy, but when rubbed into the epidermis it forms a thin film of fat.

A regular application of this compound provides the dentist's hands with the fat which has been lost; the skin's elasticity and resistance are regained. When plaster or related material has to be handled, the hands should be coated with a thin film of the ointment before work begins. Nocuous substances then cannot accumulate in pores, fissures and wrinkles of the skin. Dried plaster can be removed easily by a brush.

The application of such a preparation enables the dentist to prevent occupational skin diseases, and makes his most valuable tool—his hands—resistant to all professional strain, exertion and tension.

## Prosthetic dentistry



## Complete dentures

### Immediate dentures and the successful management of the patient who needs them

Carl W. Gieler. *Illinois D.J.* 24:793-803  
Dec. 1955

Factors important in immediate denture prosthesis include patient education, pre-extraction records, esthetics, surgical considerations, insertion and adjustment of the immediate dentures, balancing of the occlusion, maintenance, and finally, management of the patient. Fundamental factors and technics are stressed that may be employed successfully in almost every instance where dentures are needed.

The prospective patient must be told in simple language the problems that will confront him. The dentist, by skillful questioning, should discover what the patient expects of immediate dentures. The patient should be educated as to what he may anticipate and what are the limitations of such restorations. Articulated casts of the patient's mouth are valuable in educational work. It is imperative that the patient understand that immediate dentures are treatment dentures, that they are not final or permanent, and that they must be replaced as mouth and facial changes occur. The prospective denture patient should be given the book, *New Teeth for Old*, by Victor Sears.

Although it is possible to duplicate the appearance of a patient's upper anterior teeth, it is not always desirable to do so. It is nearly always possible to improve on the position of the teeth without appreciably altering the patient's facial expression. In nature, an irregularity of the anterior teeth seems to be the rule.

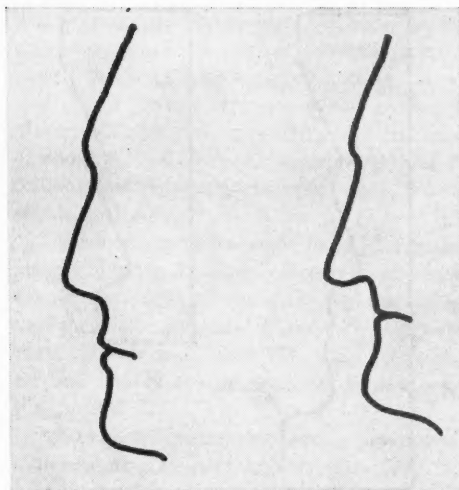


Figure 1 Changes in the nose, lips and chin (right) are caused by a closure of the vertical dimension. Such distortions often make the patient look years older than he should

The patient's natural teeth usually have various imperfections. The dentist and patient must decide whether any or all of these imperfections should be copied.

Pre-extraction records enable the dentist to work more easily and accurately and will, at a later date, be helpful when new dentures are being made. Such records should include roentgenograms; measurements of gingival pockets; study casts; two profile records (one showing an outline of the profile of the face when the teeth are in centric occlusion, and the other showing the position of the upper central incisors); a summary of conditions of the mouth; the shade and mold of the anterior teeth, and other factors which may be helpful in the construction of den-



Figure 2 The teeth to the left of the median line display youthful characteristics; those to the right show proximal and incisal wear and stained enamel cracks characteristic of the aged patient



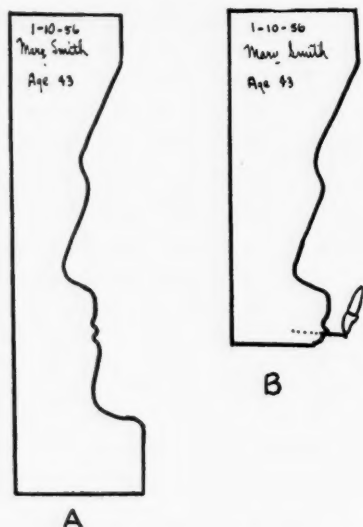


Figure 3 A cardboard cutout of the entire profile of the face (A) serves as a permanent record to be used in restoring the original vertical dimension when new dentures are to be constructed. The partial cardboard cutout (B), with a common pin inserted, acts as a guide in placing the upper central incisors in their correct vertical and labiolingual positions

tures. Photographs or color transparencies are helpful. By means of these pre-extraction records the original appearance of the patient may often be restored after the preliminary dentures have been worn for some time and the supporting tissues have changed.

When surgical intervention is necessary in the posterior part of the mouth, it should be kept to a minimum; nature should be allowed to do part of the shaping of the tissues. In many instances immediate dentures may be inserted with no surgery other than extraction of the teeth.

The insertion of an immediate denture should be a pleasurable experience. Two infraorbital block injections are made prior to removal of the upper six anterior teeth. The tissues are anesthetized, the teeth are extracted, the interproximal alveolar projections are rounded, and usually 2 or 3 mm. of the labial plate in the cuspid region is removed. A paste is wiped into the labial aspect of the denture to a thickness of 1 mm. and the denture is gently seated, carefully removed by slipping it forward and down, and inspected to

see where the areas of impingement are. A decision is made as to whether the denture should be relieved or whether the bone tissue underlying the pressure area should be removed.

A balanced occlusion is important in maintaining denture stability and mouth health. Malocclusion plays a part in the destruction of the periodontal tissues; in complete denture prosthesis, a malocclusion can destroy tissues under dentures.

Usually the patient is seen 24 hours after insertion of the immediate dentures, to correct any irritation present and to answer any questions.

Success in immediate denture prosthesis is not gained by concentrating on any one seemingly important phase and neglecting others, but rather through an understanding of all the factors involved.

#### **Insertion of beneficiary's name or identification in dentures**

Paul A. Hathorn. *Vet. Adm. Program Guide*  
G-2 M-4:23 Jan. 20, 1956

The following technic for placing a patient's name or other data in acrylic dentures for the purpose of identification produces accurate and satisfactory results.

The name and C-number are typed on white tissue paper in as small an area as possible, usually two lines. The small slip of tissue paper is cut out and retained.

A supply of pressed sheets of uncured clear acrylic resin is made up. These sheets, about four inches square and of about 26 gauge thickness, are prepared by pressing clear acrylic dough between tin-foiled stone surfaces in a giant denture flask. A sheet of casting wax 24 or 26 gauge is used for the pattern in preparing the mold. The sheets of uncured acrylic resin are stored in a container in the refrigerator, which keeps them soft and pliable.

The position for placing the name in the denture should be selected carefully. It should be in an area of the tissue-borne surface which is as flat and as nearly horizontal as possible. Ordinarily, in the upper denture the name may be placed in the area corresponding to one of the posterior palatal foramina and in the lower den-

ture on the inner surface of the posterior buccal flange. If tin foil is not used on the cast for separation in processing, the immediate area of the cast opposite the name should be faced with tin foil to prevent cloudiness in the clear acrylic insert which will cover the name.

After the first trial pack of acrylic denture base material has been placed in the processing flask, a piece of the clear acrylic sheet is cut out slightly larger than the tissue paper slip. This slip, bearing the name and number, is placed in the desired position on the exposed tissue-borne surface of the freshly packed acrylic resin. The slip of paper is moistened with two or three drops of acrylic monomer and the small wafer of clear acrylic resin is placed over it. When the flask is closed for the second trial pack, the typed name with a clear acrylic wafer over it will be depressed into the denture base material and the surface will be flush with the surrounding material. After the necessary trial packing, final closure and curing, the inserted name should appear clearly and legibly with the clear acrylic wafer overlaying it and serving as a transparent window. If correctly done, the implanted tissue paper will not be visible in the completed denture, but only the typed name and number will be seen.



### Crown and bridge

#### Gold castings by the hygroscopic technic: advantages and disadvantages

Clifford M. Sturdevant. *J.N.Carolina D.Soc.*  
39:93-98 Jan. 1956

Hygroscopic expansion is the additional setting expansion of a casting investment when the invested work is permitted to set under water. A hygroscopic casting technic utilizes hygroscopic setting expansion to compensate partially for the gold shrinkage.

The linear shrinkage of gold alloy in dental castings is approximately  $1.4 \pm 0.2$  per cent, depending on the composition of the alloy and also somewhat on the shape of the casting. In the

hygroscopic expansion technic, the compensative expansions are: (1) a hygroscopic setting expansion of the investment of approximately 1.0 per cent; (2) a thermal expansion of the investment of about 0.3 per cent, and (3) a wax expansion of about 0.1 per cent. An investment specially compounded for the hygroscopic technic is indicated.

The only equipment needed, in addition to that already found in the dental office, is a water bath. Immediately after investing the pattern, the invested work is immersed completely in a water bath (temperature,  $100^{\circ}\text{F.}$ ). The eliminating furnace should have a control that permits a setting for  $800^{\circ}\text{F.}$

Although the hygroscopic technic comes closer than any other to being a universal technic, it is best to vary the process for Class V inlays and for full crowns. For these, the hygroscopic setting expansion can be conveniently increased by doubling the spatulation time used for other pattern designs.

Conveniences of the hygroscopic technic are as follows: it can be interrupted at the close of the investing procedure; it is a low heat technic, the usual temperature of the mold at the time of casting being approximately  $850^{\circ}\text{F.}$ ; the investment mold (whether wet or dry) may be inserted directly into a furnace preheated to  $850^{\circ}\text{F.}$ ; neither the furnace temperature nor the furnace time is critical; the time from wax pattern to casting is reasonably brief (65 minutes with the small ring). The technic is particularly desirable for group castings (as in dental schools).

Disadvantages are the need for a water bath, and occasional distortions caused by the release of stresses in the wax pattern during the water bath treatment. The latter disadvantage can be minimized by careful and proper wax manipulation.

#### The copper-band splint

Leo Talkov. *J.Pros.Den.* 6:245-251 March 1956

Although the self-curing acrylic resins have revolutionized the conduct and practice of restorative dentistry, they present difficulties in obtaining a proper marginal fit. The copper-band splint, first

suggested by Fox and refined by Amsterdam, overcomes these difficulties. Essentially, each temporary crown consists of a copper band 3 or 4 mm. high, tightly adapted to the subgingival marginal area over which acrylic resin is formed and retained by the band. The result is a temporary restoration with proper marginal fit, good gingival contour, adequate retention, and the ability to prevent the cement from washing out.

Copper bands are inexpensive, come in many sizes, and are easily and accurately adapted in a few minutes. Once the band is fitted and festooned into the subgingival region, it is shortened to a height of 2 or 3 mm. supragingivally and feathered so as to be retained by the acrylic resin which will be formed over it and the prepared tooth.

Of the four basic technics described for forming the acrylic resin over the prepared tooth and band, in three the acrylic resin is polymerized in the mouth. Necessary precautions are described.

The direct technic can be used conveniently in a third to a half of the arch, and is particularly useful where there are missing teeth or discrepancies in the occlusion which can be corrected by eliminating interferences in the opposing occluding segment. With the bands in place and the proper separating medium applied, a wad of self-curing acrylic resin is adapted by hand over the region, including that of any missing teeth. The resin is inserted best before it becomes doughy and rubbery.

The surfaces of the opposing teeth are lubricated with petroleum jelly, and the patient's teeth are guided into centric occlusion and an imprint is made of the opposing teeth in the soft resin. While the patient keeps his mouth open, cool water is sprayed over the resin until it sets. The acrylic resin mass is removed from the mouth, the bare outer subgingival portions are painted in, and the bulk is trimmed to tooth form and anatomy. The temporary restoration is polished and set with temporary cement. If a band does not come off a tooth in the resin, retention will be assured by cutting out some of the intracoronal surface of the crown, relining it, and reseating the splint.

Procedures for the shell technic, the alginate technic and the extraoral technic are described.

The shell technic is indicated for anterior seg-

ments where esthetics is a major consideration, or for a full arch if it is being prepared in one sitting. The extraoral technic is necessary for patients allergic to the free monomer during polymerization occurring in the mouth.

The copper-band splint is a gratifying adjunct to the procedures of crown and bridge and occlusal rehabilitation. When all or most of the mouth is involved, these splints make it possible to correct irregularities in occlusion and support periodontally treated teeth. Gingival tissues may be maintained in maximum health. The durability and esthetics of the self-curing acrylic resins permit a comfortable interlude for carrying on all procedures to insertion of the permanent appliances, and for provisional restorations over periods of many months.

#### **Immediate transfer coping for full coverage of teeth**

J. Bardin Goodman. *New York J. Den.* 26:156  
April 1956

The immediate transfer coping is an excellent step in the accurate construction of teeth that are prepared for full coverage; namely the porcelain jacket, cast crown and veneer crown. After the teeth are prepared, a copper-band impression is taken in compound, after which a plaster impression is made of the cut tooth and those adjacent to it. The plaster impression is good only while it is on the teeth; when removed, it frequently is broken or shattered. An attempt to circumvent this by placing warm inlay wax around the prepared tooth and making a plaster impression over the wax will fail because accuracy is lost as the wax becomes warped from the heat or becomes distorted on removal. Attempts to use a copper band with compound placed on the prepared tooth and to make a plaster impression over that will fail for the same reason.

The immediate transfer coping can be made easily at the chair in a few minutes. An aluminum shell is trimmed at the gingival edges for a good fit, and adjusted to the height of the adjacent teeth. Two holes are punched in the shell to identify the buccal side and to permit the excess



impression paste to escape. When the aluminum bands are ready, a zinc oxide impression paste is mixed and placed in the shells which are then placed on the prepared teeth. The paste will set in one minute. The excess material is trimmed away, and a plaster impression is taken over the bands that are on the abutment teeth.

When the plaster impression is removed, the aluminum shells will adhere to the plaster, which will come out in one piece. The plaster setting will not alter the impression paste, nor warp it on removal. Thus immediate transfer copings can be processed that are accurate and easy to make. This leads to a better aligned bridge or crown. The entire fixed bridge can be processed in one visit because of the accuracy in reseating the dies of the abutment teeth.

The aluminum shells are easily made in a short time. They can be used in mouth rehabilitation for adjusting the occlusion by determining the vertical height. The shells will not change because of the hardness of the paste in them; also, no changes will occur because of mouth heat or biting pressure.



## Partial dentures

### Immediate fixed partial denture (Die Immediatprothese)

Fritz Schön. *Deut.zahnärztl.Zschr.* 10:1405-1412  
Nov. 1, 1955

Immediate fixed partial dentures are not temporary prostheses but permanent restorations. They are inserted immediately after the extraction of one or two teeth. Usually, partial prostheses are constructed before tooth extraction and placed in position when the healing process is complete.

The technic of construction of immediate fixed

partial dentures consists in preparation of the abutment teeth to receive the retainers. After being cast, these retainers are placed in correct position. Wax bite and impressions are taken, and the working model is constructed. A pontic is fitted in the place of the extracted tooth and united with the retainers. When the denture has been constructed, it can be inserted immediately. The dentist should ascertain, however, that no danger exists of a secondary infection.

An immediate fixed partial denture is indicated only when there is a sufficient quantity and quality of normal alveolar process present before and after tooth extraction. Statics and dynamics of the prosthesis can influence the degree of healing of the alveolar ridge. To use those forces, the immediate denture is employed. By correct fit, the connective tissue will be able to support the bridge; the alveolar process is resorbed and the osseous tissue regenerated; consequently, there will be less likelihood of further resorption.

Frequently, bridges are set temporarily, to allow the abutment teeth to adjust themselves so that the bridge may be cemented at a subsequent sitting. This procedure is necessary only when malrelations occur during the assembling of the bridge. It is a better and safer procedure in such instances to unsolder the bridge, to take a new wax bite and impression, and resolder the prosthesis.

The contact points should be tested with a ligature and, if found to be incorrectly placed or inadequate, the bridge must be reinvested and the contact points corrected. The occlusion of the artificial denture should be verified with its opposing teeth in centric, lateral and protrusive positions. If interferences occur, the bridge should be removed and the high points reduced. If necessary, the gingival surface of the pontic should be ground and reglazed before the bridge is cemented.

Roentgenograms should be taken to ascertain the accuracy of the gingival and peripheral fit, and to make sure that no cement particles remain.

## Periodontics and endodontics



## Diagnosis of bruxism

## by measurement of the tooth mobility

H. A. Hirt and H. R. Mühlemann.

*Parodontol., Zürich* 9:47-55, 1955

Karolyi (1901) was the first to associate periodontal lesions with hypertonic or spastic conditions of the masticatory musculature. He assumed that abnormal functions such as inaudible clenching, clamping, audible gnashing, clicking and grinding of teeth may be traumatogenic factors in periodontal disease.

A critical evaluation of the "Karolyi effects,"—grinding of the teeth, occlusal neurosis, or bruxism—reveals that those who believe in the periodontal trauma also believe that the different habits are

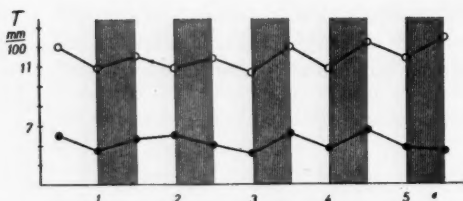
a significant, contributory cause of periodontal tissue decomposition. There is no report, however, of the objective and scientific diagnosis of bruxism, nor of periodontal alterations specifically caused by habitual spastic muscle forces which are nonintermittent and excessive in magnitude and duration (Leof, 1944).

The diagnosis of habits has been based solely on the subjective information obtained from patients. Reports indicate that tooth grinding prevails either during the night (bruxism) or throughout the day (bruxomania); frequently it occurs during both sleeping and waking hours. Sicke (1951) reported that in a group of 127 children from 2 to 5 years old, 78 per cent had either bruxism or bruxomania. No similar data are available regarding adults.

The activity of the masticatory muscles has been examined electromyographically by Moyers (1949) and Eschler (1952). Bruxism was relatively rare even when attrition was present. Eschler concluded that isometric muscle contractions cannot be the sole cause of periodontitis.

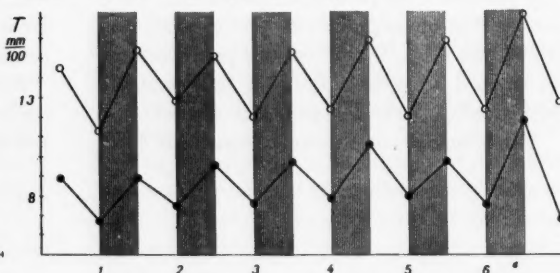
Further investigations with instruments recording myoelectric phenomena may explain this physiologic and pathologic behavior of the oral musculature. The periodontist, however, is more concerned with diagnosis, with the relationship between abnormal muscle activity and reaction of periodontal structures, than he is with etiologic hypotheses.

Graph 1 Average TM in mm/100 of 21 + 12. TM measurements at 6 p.m. and at 8 a.m. on 5½ consecutive days in patient without bruxism. Upper curve: TM measurements with 500 Grams. Lower curve: Measurements with 100 Grams. ||||| 6 p.m.—8 a.m. period. d = days, T = total crown excursion



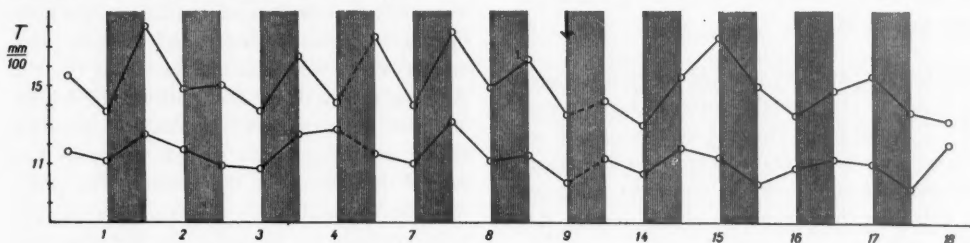
Graph 1

Graph 2 Average TM in mm/100 of 21 + 12. TM measurements at 6 p.m. and at 8 a.m. on 6½ consecutive days in patient with bruxism. Upper curve: TM measurements with 500 Grams. Lower curve: TM measurements with 100 Grams. ||||| 6 p.m.—8 a.m. period. d = days, T = total crown excursion



Graph 2

**Graph 3** Average TM in mm/100. TM measurements at 6 p.m. and at 8 a.m. on days 1 to 4, 7 to 9 and 14 to 18 in patient with bruxism. The arrow indicates the insertion of a bite plate which eliminated the transmission of oral muscle forces on the teeth. Upper curve: Average TM of 1 + 1. Lower curve: Average TM of 2 + 2. ||||| 6 p.m.—8 a.m. period. d = days, T = total crown excursion. Observe change of 6 p.m.—8 a.m. periodicity of 1 + 1 after the insertion of bite plate



Graph 3

Tooth mobility measurements, performed with dial indicator and dynamometer, were made on several patients after breakfast and before dinner, on the upper incisors (twice for each tooth), using 100 and 500 Gm. forces.

Some of the patients pretended to be conscious of bruxism. In three instances, no clinical or roentgenographic evidence of gingival or periodontal disease was found.

After the tooth mobility tests had been made for 4 to 6 days, acrylic bite plates were inserted. These plates raised the bite in the molar region so that no occlusion was possible in the incisor region. Any habits that caused trauma to the incisors during the night were thereby eliminated. Five days after the insertion, the measurements were repeated. The data recorded are shown in the graphs and the table.

Bruxism was associated with a regular and pronounced increase of tooth mobility. The elimination of oral muscle habits was followed by the disappearance of the increase in nocturnal mobility.

**Table** Increase of tooth mobility during the 6 P.M.—8 A.M. period

Case	Bruxism	Teeth	No. measurements	T*	Av. Increase mm./100	S.E.	Significance P <sub>t</sub>
1	+	21 + 12	20	500	+ 0.97	0.2	< 0.001
	+	21 + 12	20	500	+ 3.55	0.2	
3	No	2 + 2	28	100	+ 0.48	0.3	= 0.005
				500			
	A +	1 + 1	28	100	+ 1.94	0.3	< 0.001
	B +	1 + 1	20	100	— 0.22	0.5	
				500			

\*Total crown excursion induced by a 500 or 100 Gm. force.

S.E. is standard error.

A. Before insertion of bite plate.

B. After insertion of bite plate.

The three cases reported demonstrate the value of tooth mobility measurements in the diagnosis of bruxism. Biophysical changes of the collagenous structures anchoring the teeth are probably caused by parafunctional stress and lead to increased tooth mobility.

**Closure of exposure of the pulp  
with application of antibiotics**  
(Recubrimientos pulpaes con antibióticos)

H. Morales Villarino. *Rev.dent.Chile* 45:724-726  
July-Aug. 1955

One hundred and fifty patients between the ages of 9 and 25 years sought treatment for exposure of the dental pulp. The diagnosis was made on the basis of clinical and roentgenographic examinations and pulpometry. A treatment consisted of enlarging the perforation of exposure of the pulp and applying antibiotics and vitamin C, calcium hydroxide, and zinc eugenol in three layers, the whole covered with cement oxyphosphate. Streptomycin, penicillin and sulfonamide were used in the anterior teeth, chlortetracycline and chloramphenicol in the posterior teeth. Preparation of the cavity one or two days before the operation consisted of cleaning, as much as the patient's sensibility permitted, the cavity with small spoons or burs and filling the bottom of the cavity with melted thymol and the rest of the cavity with zinc oxide and eugenol.

The operation was as follows:

1. The tooth to be treated was isolated with a rubber dam.
2. The eugenol was removed and the cavity cleaned, beginning on the lateral walls and proceeding toward the bottom of the cavity. The pulp was exposed when the area that covered the inflamed portion of the pulp was being cleaned.

The opening of the exposure was enlarged by means of small spoons. The inflamed portion of the pulp was removed, the hemorrhage checked with swabs of sterile cotton, and the cavity washed with saline solution and dried. Then the paste prepared with the antibiotics and vitamin C was pressed into the bottom of the cavity by means of a swab of sterile cotton. The surplus paste was removed carefully. The layer of calcium hydroxide was then introduced into the cavity, followed by the layer of zinc oxide and eugenol, and lastly by that of cement oxyphosphate. The patient was told to return once a month for six consecutive months so that the effect of the treatment could be observed.

Ninety per cent of the patients complained of

pain caused by cold stimuli. It seemed to have been caused by absorption of the antibiotics on the part of the pulp in the chamber. Pain disappeared sooner in the patients who had received vitamin E as a complementary treatment. The post-operative examinations were made with the pulpometer. There were four failures among the 150 patients. In two of the four patients the surplus antibiotic paste had not been removed from the cavity, and the antibiotic paste in the cavity had caused detachment of the cement. The pulps had been exposed for several days before the patients reported for treatment. In the other two patients the failure was caused by diagnostic errors made before the operation was planned.

This method cannot be used in the treatment of exposure of the pulp in the upper lateral incisors and lower lateral and central incisors because these teeth are too thin to retain the three layers of drugs that must be placed in the cavity.

**Unusual origin of acute pulpitis:  
report of case** (Ungewöhnliche Genese einer  
akuten Pulpitis)

E. Harndt, Berlin. *Österr.*  
*Ztschr. Zahnheilk.* 9:114 July 1955

The relation between foci and dental diseases has been discussed frequently in dental literature. The case here reported tells of an unusual origin of acute suppurating pulpitis.

The patient, a 12 year old boy, during periodic examination, complained of constant severe pains localized in the vicinity of the lower left second molar which had erupted recently. The clinical symptoms of an acute inflammation were present. Because the structures, especially the crown, of the involved tooth seemed intact, extraction was postponed. After a few days, the patient returned, complaining that the pain was intolerable. The patient's temperature increased to 100.8° F. After the extraction of the lower left second molar, the pain ceased almost immediately, and the healing process seemed to be normal. Subsequently the diagnosis was hematogenic pulpitis caused by factors unknown.

About six weeks later, similar symptoms appeared in the vicinity of the lower left bicuspid. There was no increase in temperature. Even the

lightest palpation aggravated the pain. It was assumed that an accumulation of undefined species of scattered foci was the causative factor.

Histological examination revealed the typical picture of *pulpitis acuta purulenta partialis*, and the presence of an abscess in the buccal part of the coronal pulp. Bundles of odontoblasts had lost their normal ability to form the outer surface of the pulp adjacent to the dentin. These odontoblasts now filled the arising cleft as undifferentiated connective tissue. Alterations occurring in the soft tissues caused the formation of an osteoclastic resorption lacuna and the destruction of structural particles in the vicinity of the tooth root. The acute pulpitis in both teeth had been caused by these traumatic changes.

The progress of the disease, and the histologic examination disproved the primary diagnosis of hematogenic pulpitis caused by scattered foci. The systemic factors which may be involved in the development of a disease must be considered and reconsidered, and the question of surgical excision of the involved soft tissues should be taken into consideration. Hematogenic pulpitis may sometimes be the oral manifestation of acute suppurating pulpitis, but the associated constitutional symptoms are different. Diagnosis of this disease in its early stages permits proper treatment, adequate repair and prevention of mutilated dentition.



## Periodontics

### Present-day status of knowledge on the treatment of periodontal disease

(Estado actual de los conocimientos sobre el tratamiento de la enfermedad periodontal)

I. Glickman, Boston. *Heraldo dent.* 1:9-18 Nov. 1955

Periodontal disease with chronic destruction of the alveolar bone is of great importance because, if treatment is not given, it is the main cause of loss of teeth in adults. The loss of the alveolar bone in periodontal disease is the result of a process of chronic destruction, with bone resorption

in the presence of formation of new bone. The disease progresses with intermittent periods of aggravation and amelioration, the degree of which depends on the presence and the severity of gingival inflammation or of systemic diseases. Up to now, the treatment of periodontal disease has consisted of the use of local surgical procedures for the elimination of the pocket and the removal of the calculi. The local use of drugs has been of no value. Antibiotics and chemotherapy have not as yet been resorted to. The use of a systemic medical treatment, alone or as an adjunct to local surgical treatment, is advisable. One theory regarding periodontal disease is that the loss of the alveolar bone in the course of periodontal disease is due to an imbalance of the tissue metabolism, which originates in local or systemic diseases and inhibits the normal process of bone formation. The metabolic imbalance of the tissues manifests itself with a deficiency in the protoplasm of the osteoid matrix or with one in the activity of the osteoblasts. This deficiency in the presence of a normal process of bone resorption results in the lack of newly formed bone and a loss of bone substance.

Clinically, disorders of tissue metabolism may produce any of the following effects: (1) a loss of the alveolar bone; (2) an aggravation of the severity of the destruction of the alveolar bone in the presence of gingival inflammation, or (3) an inability of the alveolar bone to withstand functional forces with consequent transformation of the physiologic forces into forces that are harmful to the bone.

To test the theory, experiments were made in adult rats. The animals were given cortisone (as the hormone which regulates the metabolism of the periodontal bone). The drug was given in daily injections of 0.5 mg. for varying periods, in some instances for as long as 43 days. At the end of the experiment, there was no gingival inflammation. Examination showed osteoporosis of the alveolar bone with diminution of the number of osteoblasts, a small amount of newly formed bone matrix, and a decrease in the height of the alveolar bone. In the periodontal membrane the number of fibroblasts and collagen fibers was diminished and there was degeneration of the collagen fibers. Similar changes were observed in some skeletal bones.



A second series of experiments was undertaken to ascertain whether the osteoporotic effect of cortisone could be counteracted by the use of an estrogenic hormone. The adult rats used in the first experiment were given weekly injections of 600 U.R. of estradiol benzoate concurrently with the daily administration of cortisone. The osteoporotic effect that cortisone had had on the alveolar bone when it was given alone was greatly diminished when estradiol benzoate was added to the treatment. The main local difference was the presence of a large quantity of newly formed bone, which had formed along the entire endosteal surfaces of the bone and over the entire crest of the interdental septum. The newly formed bone completely restored to normal the height of the alveolar bone in relation to the teeth. The experiments show that the alveolar bone can be restored to normal by means of systemic hormonal treatment. These experimental results are promising but it has not been determined whether the results of systemic hormonal treatment in human beings would be as satisfactory as those obtained in these experiments. Also it has not been determined whether the estrogenic hormone used in these experiments is the only substance capable of restoring to normal the alveolar bone after it has been more or less destroyed in the course of periodontal disease. The findings are reported as an invitation for further research on the subject. If equally good results are reported by other workers, they will give dentists a new point of view toward the treatment of periodontal disease.

#### **The epithelial reattachment**

**in parodontopathy** (Sul problema del riattacco epiteliale nelle parodontopatie)

G. Ceria. *Minerva stomat.* 4:165-174  
June 1955

The clinical and histologic condition of parodontopathies, especially in regard to noninflammatory diseases of the supporting tissues, termed

"diffuse alveolar atrophy," was described by Gottlieb (1921, 1923). Since then, valuable scientific and clinical contributions have appeared in the dental literature, particularly in the United States. Although these reports frequently disagree in regard to etiology and therapy, they agree that the main characteristics are atrophy of the alveolar bone and widening of the periodontal membrane, caused by a degeneration of the principal fibers.

According to all observations, no inflammatory reaction of the gingiva occurs. Pockets, formed in later stages, however, permit the accumulation of food particles, calculus, and the development of microorganisms. As a secondary pathologic condition, inflammation of the connective tissues, caused by a mechanical irritation or bacterial toxins, may occur.

That an epithelial reattachment of soft tissues to the root surface can take place after these tissues have been detached through periodontitis, has been claimed for many years. This claim, however, has been widely disputed, with counterclaims stating that this supposed reattachment is nothing but a close approximation of the soft tissues to the root surface.

In a great percentage of instances, by proper treatment, an epithelial, periodontal reattachment can be induced, and the desired result obtained.

It is a matter of considerable importance to the dental profession to know definitely whether the complete closure of the periodontal pockets by an organic reattachment of the soft tissues to the root surfaces can be achieved. Many recent investigations indicate that it is possible. The eradication of foci, and the saving of teeth which otherwise would have been lost or subjected to extensive gingivectomy, can be accomplished in a large percentage of cases. According to the recently published reports, especially those by the Argentinian Carranza, evidence is offered that epithelial reattachment not only is possible, but that regeneration of the alveolar bone also may occur.

## Armamentarium



### Materials

#### The residual monomer

H. Passow. *Dental Echo* 25:74-76 Nov. 7, 1955

In the polymeric process, the balance of monomers—simple molecules of compounds with a relatively low molecular weight—is termed “residual monomer.” This unpolymerized balance remains in the polymeric and autopolymeric material. The greater the quantity of monomeric fluid used in the polymeric process, the greater is the amount of residual monomer in polymerized acrylic resin.

In chemistry, the term “residual monomer” is not used to describe monomers which penetrate immediately into the dentin after a synthetic resin filling has been placed. In dental practice, however, this term is used to designate monomers which, after completion of the filling, slowly migrate from the acrylic material into the dentin. These residual monomers contain catalytic remains which are unable to cause polymerization of monomers that already have penetrated the microscopic dentin canaliculi.

In some reports, it has been assumed that not the monomers which already have penetrated the dentin region but the dissolved catalysts cause trauma to the pulp after fillings. No evidence was presented, however, as to whether the pulp can be injured by monomers alone, by monomers in conjunction with catalysts, or by catalysts alone. During polymerization of artificial dentures, the residual monomer may irritate the mucous membrane and may cause allergic symptoms. The data presented, however, vary in regard to cause and consequence.

Besides physiologic injuries which may be caused by residual monomers, there are chemical and physical traumas which definitely are caused by the residual monomers of acrylic resins during the polymeric or autopolymeric process.

The residual monomer may remain in the acrylic material for years. Synthetic resins, pre-

pared in the usual manner, often develop a typical monomeric smell even years after construction. Usually, as soon as acrylic resins are placed in the tooth cavity, the residual monomers gradually leave the acrylic material. This slow departure continues for from four to six months. Most acrylic resins have a capacity to absorb water at the rate of about 0.5 per cent within four days. The loss of residual monomers increases the absorption of water, causing strains in the artificial dentures which may lead to an unfavorable expansion of the prosthesis. The margins may be altered and the accuracy of fit will be reduced. This change in the material may cause functional trauma because the overexpanded denture presses constantly against the tissues during each firm bite. Such an undesirable alteration cannot occur when steel prostheses are used. The continued pressure increases the danger of breakage; the acrylic resin is unable to resist such a continuous strain, and finally the denture breaks. The prosthesis then has to be repaired and completely relined. Metal inlays can delay but not prevent the breakage.

Plastic dentures should be constructed as rigidly as steel prostheses. Elastopolyzation, a new technic, removes the residual monomers chemically. This process is as automatic as polymerization.

#### Twenty years of dental materials research in Australia: The story of the Commonwealth Bureau of Dental Standards

Alan R. Docking. *Austral.J.Den.* 59:378-389 Dec. 1955

In 1934, at the urging of Professor J. Neill Greenwood, then in charge of the department of metallurgy of the University of Melbourne, a research laboratory was established at the Dental School of that university. At the beginning of 1947 the Commonwealth Department of Health took over the laboratory. Today it is the only national laboratory outside of the United States devoted to the study of dental materials.

Most of the initial research work concerned dental amalgams, as was the case with the dental section of the National Bureau of Standards in

Washington, a laboratory that has been a source of inspiration to its younger Australian counterpart.

In the early years financial assistance came from local sources, including the Dental Board of Victoria. In 1939 the National Health and Medical Research Council began to subsidize what was then known as the "Metallographic Research Laboratory," later changed to "Materials Research Laboratory." By 1946 the investigations of the laboratory had spread to all the major classes of dental materials. The work of the research staff had been described in over 40 articles in the *Australian Journal of Dentistry* and in overseas journals.

The Commonwealth Bureau of Dental Standards is today housed in a building at the University of Melbourne. The personnel numbers seven, representing the professions of chemistry, physics and metallurgy.

Associated committees include an advisory committee comprising several university professors appointed by the Department of Health; a standards committee appointed by the Australian Dental Association, and the sectional committee on dental materials of the Standards Association of Australia. Each contributes to the work of the Bureau, and their efforts have facilitated the introduction of a voluntary certification scheme which has resulted in an improvement in the quality of dental materials with the discouragement and sometimes the discontinuance of the manufacture or importation of inferior products.

The chief activities of the Bureau are research, standards, testing and information. The work of the Bureau has extended to surgical materials and the field of precision casting in industry. Among the research projects undertaken are those relating to the following: amalgam variables, orthodontic cements, hygroscopic expansion, denture repairs, whitening of denture resin, and face masks.

Methods have been investigated for testing modeling compounds, casting investments, modeling wax, impression pastes, dental burs, local anesthetic solutions, denture base resins, sticky waxes, hydrocolloidal impression materials, casting and wrought gold alloys.

Practically the whole range of dental materials has been covered in the course of testing for out-

side organizations and firms, and 2,000 samples have been examined since 1947. Some testing is done for clients overseas. It is not unusual to find the Australian bureau testing to an American specification for a European firm.

Testing of dental products on the local market has led to information concerning their relative merits and such data are made available to dentists on request. A regular feature known as "Dental Materials—Current Notes" is published in the local dental journals. It covers developments in materials and technics reported from all over the world.

#### **Sulfinic acid derivatives as accelerators in the polymerization of methyl methacrylate**

G. M. Brauer and F. R. Burns. *J. Polymer Sc.*  
19:311-321 Feb. 1956

The use of organic sulfinic acids to promote rapid polymerization of methyl methacrylate and other vinyl monomers has been advocated for several reasons, one of which is to decrease the color of the polymeric product. This is an advantage over the colored products that are usually formed when methyl methacrylate is polymerized with a benzoyl peroxide-amine system.

Furthermore, sulfinic acid requires no induction period. The polymerization starts immediately. The sulfinic acid does not oxidize the hydroquinone inhibitor or react with any quinone present. In the presence of air, sulfinic acids readily oxidize to sulfonic acids and other oxidation products which do not act as polymerization activators. This poor storage stability limits the use of these accelerators.

In the present investigation a detailed study was made of the efficiency of amine salts of *p*-toluenesulfinic acid as accelerators in the polymerization of methyl methacrylate. These compounds are readily synthesized by the addition of amine to the ether solution of the sulfinic acid. Most of the salts are stable in air. Salts of secondary and tertiary aromatic amines are efficient accelerators in the benzoyl peroxide-initiated polymerization. Colored products are formed, however. Aliphatic amine salts as well as the free

acid give colorless polymers, but the setting time is increased considerably. Heterocyclic amines show reduced activity as polymerization accelerators. The setting times of monomer-polymer mixtures containing some of these accelerators have been determined. Physical properties of the polymers have been evaluated by measuring their resistance to indentation and recovery.



### Equipment

#### The "Dentadolor" (Der "Dentadolor")

C. Apex. *Dent. Echo* 25:73-75 Dec. 1955

The "Dentadolor" is a recently introduced instrument for use in anesthesia. This apparatus aroused interest at the latest Paris Dental Exhibition.

The Dentadolor can be used to obtain painless drilling and to introduce syringe needles without pain, for gingival anesthesia and for extraction of loose permanent or deciduous teeth. It also can aid in gingivectomy, in cutting dentin and in complicated extractions.

Practical experience reveals that cold air blown into cavities causes intolerable pain; a stream of warm air, however, decreases the pain. Intense pain appears as soon as the cavity becomes dry. Warm water sprayed into the cavity always is pain-dispelling.

The Dentadolor uses a nozzle to blow damp, warm drug-containing air into the cavity. The medicament usually employed is hygroscopic (sodium bicarbonate in a saturated solution of glycerine); it desiccates carious dentin instantly. No pain will occur, and a painless drilling even with a slow rotating bur is possible. In freeing the cavity from all carious parts, blowing and drilling should be done simultaneously. The frictional heat of drilling burs is dissipated, chips are removed, and the surface is anesthetized so that the bur operates in a region which is without the sensation of touch or pain.

The drug, applied in streams of damp and warm air, does not hamper the drilling. The apparatus is connected with a reconstructed mouth mirror. The upper part of the mirror handle contains a small heating system; the lower part contains a mixing chamber. The mouth mirror is perforated and equipped with the nozzle which automatically is directed toward the cavity during the drilling process.

The heating system contains a switch, and the air tube is connected to a compressor and can be regulated by turning the cord on the switchboard. Usually, the stream of air reaches a temperature of from 35 to 40° C. and stays at that temperature. This warm stream forms a vacuum at the aperture of the tube, after the drug is mixed with air in small glass cylinders. The capillary effect slows down the rate of flow, and, in order to secure a uniform distribution of the drug, a metal rod is soldered into the tube. This rod touches the inner side of the glass, and the drug accumulates by adhesion. The vacuum seizes small fractions of the drug only, and carries the mixture with it.

The dentist's vision is not hampered. The Dentadolor is especially useful when cavity preparation may become unpleasant to the patient. Before work on the cavity is begun, all carious parts and their vicinity should be anesthetized completely by infiltrating the infected dentin with the Dentadolor's air stream. Bacteria cannot enter this air stream because they will be retained by glycerine.

The apparatus can be applied immediately without special preparation. No undesirable secondary effects occur. The maximum anesthetic effect will be obtained at a point up to 2 mm. from the revolving bur; the heating should correspond with the body temperature, and no cold air permitted to enter the cavity. In instances in which the burs operate in soft dentin, the air pressure should be kept in the neighborhood of from 30 to 45 pounds per square inch, and in instances of hard dentin at a pressure of approximately 45 to 75 pounds per square inch.

Favorable results were achieved when the mixture was replaced by benzyl alcohol and chloroform (equal parts) for temporary relief of pain, especially in instances of hypersensitive dentin.



## Operative dentistry



### Inlays and fillings

#### **The present conditions of oral medicine and operative dentistry in Japan**

Toshiji Ogata. *Asia D. Congress* 7-10, 1955

Conservative dentistry in Japan was begun more than 60 years ago, and developed to include dental therapeutics and the filling of teeth. After World War II the educational system was reformed, and conservative dentistry was divided into two branches: the sphere of oral medicine was enlarged to include the treatment of diseases of the oral soft tissues requiring no surgical treatment, and the second branch was called "operative dentistry."

In oral medicine, electro-anesthesia is used for desensitizing in the excavation of dentin, and in injecting and curetting a gingival pocket. Comprehensive guides to conservative treatment of the pulp have been published. Various clinicopathologic and pharmacologic studies have been made on desensitization, pulp amputation and pulp extirpation. It has been demonstrated that the iontophoresis occurring in the root canal treatment shortens the period of sterilization and treatment. Various studies are now under way on the efficacy of the antibiotics for root canal treatment. In the filling of root canals, comparative research has been carried out on the therapy achieved by single and combined uses of various substances. The Committee of Synthetic Studies on Pyorrhea is now carrying out clinical studies from the viewpoint of basic science. Observations have been made on the relationships between the absorption of alveolar bone, tooth mobility, and the changes in the physiologic mobility according to age. The treatment of diseases of oral hard tissue has been revolutionized by antibiotics.

In operative dentistry, for excavating the hard tissues of the mouth, the former method of drill-

ing by the revolving power of the machine has been discontinued, and a process utilizing the conversion of the electric vibration of supersonic frequency into mechanical vibration is being used. A tester to study the excavating abilities of dental instruments has been devised. Minute comparative experiments on the subject of inlays have been completed. It has been found that with the alginate indirect method, inlays can be prepared with more precision and simplicity. New instruments and technics have been devised and put to practical use. It has been found that whereas gold foil fillings have leaky margins, inlays and amalgam fillings do not. Studies are now being made on various medicines in the making of wax patterns, pressures in plastic fillings, and the effect of synthetic resin and porcelain on bacilli.

Two scientific societies for conservative dentistry exist in Japan: the panel of operative dentistry of the Japan Dental Association, and the Society of Operative Dentistry and Oral Medicine (recently founded). The departments of operative dentistry of the various dental colleges have been cooperating for more than ten years.

Oral medicine and operative dentistry in the field of pedodontics now has a chair of its own in each of the colleges and universities.

#### **Amalgam in pedodontics**

Hugo M. Kulstad. *J. Den. Children* 22:170-174  
Oct. 1955

More teeth are filled with amalgam than with all other materials combined. Amalgam has saved more teeth than all other materials combined. More office time is spent on amalgam fillings than on any other office procedure. Yet less space in dental journals is devoted to this subject than to almost any other procedure in dentistry.

Although amalgam responds beautifully to precision technics, it lends itself to abuse by the careless operator because of its plastic nature.

Almost all patients dislike having teeth filled, and the main reason is fear of pain. Anesthetics should be used routinely unless there is an objection based on medical reasons.

A rubber dam is essential in good amalgam



work for the following reasons: (1) insures a dry field; (2) reduces operating time because of better visibility and no time out for washing and spitting; (3) protects the patient; (4) controls the child patient and gives him a feeling of being protected; (5) helps in the use of inhalation anesthetics, and (6) is necessary if gas-driven abrasives are used to cut the cavity.

With the dam in place and the patient comfortable, the exposed tooth is swabbed off with alcohol, except where silicate cements are present; these are covered by cocoa butter or petroleum jelly.

Preparation of the cavity, adaptation of the matrix, sterilization, preparation of the alloy, condensation, carving, finishing and polishing are discussed.

Cavity preparation must follow the established rules. Both depth and width must be adequate. Amalgam cannot be condensed against slanting and curved surfaces. Retention points and grooves should be definite but not too narrow.

Ammoniacal silver nitrate is considered by many dentists to be a fine agent for sterilizing cavities in posterior teeth. Other useful sterilizing agents are phenol and alcohol, eugenol, thymol and nitromersol. A cavity varnish, which will help seal the tubuli, should be used routinely.

The selection of an alloy is no longer a problem, since alloys of the leading manufacturers conform to specifications of the American Dental Association. If the directions of the manufacturer are followed, good results will be obtained con-

sistently. If a mechanical amalgamator is used, directions must be followed precisely; in a mixing time of six to eight seconds, the variation of as much as one second will change an amalgam completely. Under-trituration and over-trituration may lead to failure. When trituration has been completed, the amalgam should be mulled by placing it in a piece of clean rubber dam and rolling it between the fingers, or by rubbing it in the mortar with a finger enclosed in a finger stall.

Condensation should follow immediately, since no mix should be used for over four minutes.

After the cavity has been overfilled, the occlusal surface should be carved to its approximate form, and the matrix carefully removed so as not to disturb the filling. Before the patient is dismissed, the gingiva should be examined for possible overhang. It is easier to remove any excess at this time than when the amalgam has set completely. The patient must be warned not to bite or chew on fresh amalgam until several hours have passed.

Polishing should not be done for 72 hours. Heat must be avoided; it is damaging to the filling and uncomfortable to the patients. Polishing is necessary to remove the "bloom" of the amalgam, to reduce galvanic action and to bring out the value of the filling.

Although good amalgam work costs less than gold fillings, it is not "cheap" dentistry. The patient will be compensated by good service from the filled tooth; the operator should be compensated by a fair fee.

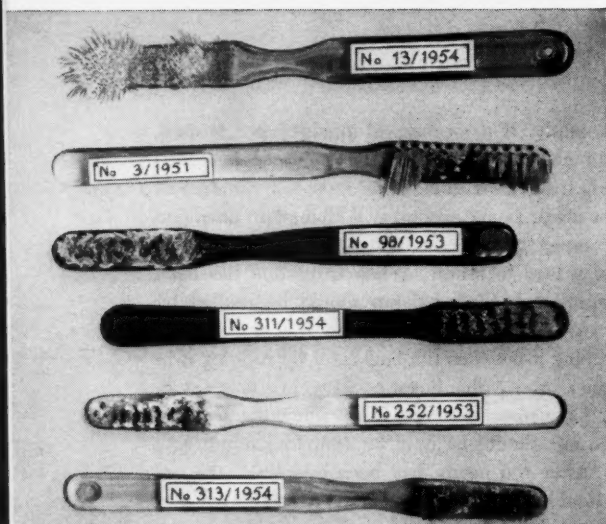


Figure 1 Wearing out of natural bristles

#### Preventive and public health dentistry



#### Hygiene and prophylaxis

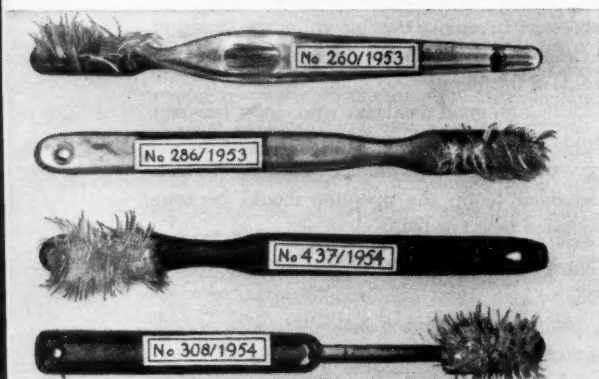


Figure 2 Deformation of synthetic bristles

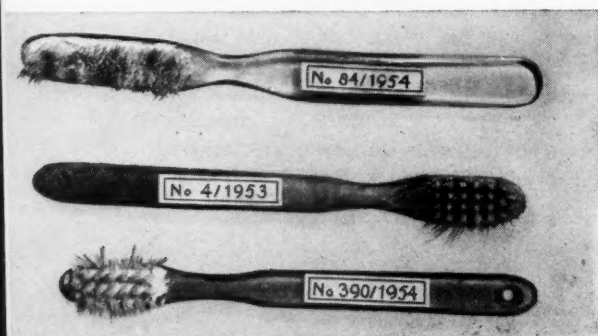


Figure 3 Unhygienic brushes

## An investigation of the use of toothbrushes in the Netherlands

(Een enquête over het gebruik van de tandenborstel in Nederland)

O. Birman and B. Kantorowicz. *Tschr.tandheelk.* 62:505-512 July 1955

During November and December 1954, the Medinos-Prodenta Research Laboratory, Amersfoort, Netherlands, collected 942 used toothbrushes from about 1,000 Dutch families. Of these, 40 per cent had been used by women, 28 per cent by men, 15 per cent by boys and 17 per cent by girls. More than 10 per cent of the persons questioned did not use toothbrushes. In the lower income group this figure rose to about 30 per cent. In 36 instances, the same toothbrush had been used by more than one member of the family.

Almost half of the brushes collected had been bought in 1954, 31.5 per cent in 1953, 11.5 per cent in 1952, 4 per cent in 1951, 3 per cent in 1950, and 3 per cent in 1949 or even earlier.

Forty per cent of these brushes were made of natural (animal) bristles and 60 per cent of synthetic bristles. Considerable differences were observed between the condition of brushes made of natural bristles and those made of synthetic bristles. The natural bristles wore out sooner and appeared dirty and contaminated; the synthetic bristles deformed less rapidly, the degree of deformation and contamination depending on the quality of the bristle material used. The advantage of synthetic bristles seems to be that usually they are perfectly smooth on the surface and that they consist of rods and not of tubes.

The shape of the toothbrush handles differed greatly and there were differences in the material used in these handles.

Only a few of the toothbrushes collected could meet the standards set up by the Dutch dental profession and the dental industry.

The working surface of toothbrushes should be 1.0 by 0.4 inches. Of the brushes examined, 12 per cent had a working surface of 1.0 by 0.4; 43 per cent, of about 1.4 by 0.4; 44 per cent, ex-

ceeding 1.4 by 0.4, and 1 per cent were exceptionally small, probably designed for infants but used by adults, often even as "family brushes."

In 62 per cent of the toothbrushes, 158 different national and international firm brands were represented; 10 per cent showed no brand names.

No observable difference in wear appeared between toothbrushes used by men, women, girls or boys.

More than 56 per cent of the brushes could not have been used further because they were worn out completely, and an additional 11 per cent were rejected because they were in an unhygienic condition. The investigation indicated, therefore, that more than 67 per cent of the toothbrushes collected were unfit for oral hygienic use.

It can be concluded that the great majority of persons are using unsuitable toothbrushes. They are unsuitable because of (1) incorrect shape, (2) extreme wear, and (3) unhygienic condition. People do not appear to know how toothbrushes should be handled or kept. Neither do they realize when the toothbrush has become unsuitable for further use and should be replaced by a new one.

It is obvious that, with such an unsuitable aid, adequate oral hygiene cannot be achieved.

### **Alfred C. Fones: the man and his project**

Russell W. Bunting. *J. Connecticut D.A.* 30:7-10 Jan. 1956

Fones, the Bridgeport dentist who pioneered in the field of oral hygiene, championed and brought to fruition a revolutionary and unproved theory of dental health service, against widespread and bitter opposition. Alfred Fones was not the first to advocate the employment of young women assistants to give dental prophylaxes, but he was the first to put the idea into practice. The idea was opposed by great numbers of dentists.

Fones was probably most stimulated by the work of D. D. Smith, of Philadelphia, who since 1894 had been practicing an efficient kind of preventive dental service. Fones studied and practiced Smith's methods and became convinced that regular and thorough prophylactic measures were conducive to oral health. Realizing that such

treatment was time-consuming, Fones conceived the idea of employing young women who, with brief training, could perform this service for the dentist.

In 1905 he trained the first dental hygienist, Irene Neuman, in his own office, though there was no legal provision to permit such practice. Two years later the Connecticut State Dental Board of Examiners agreed not to object to the employment of women in dental offices to clean teeth. In 1913 Fones offered a course in training of young women as dental hygienists. He induced city officials in Bridgeport to contribute \$5,000 to the project. The first course was a great success and was followed by two others. In 1915 the Connecticut state law was amended to permit dental hygiene practice. Massachusetts took similar action the same year. In 1916 New York passed a dental hygiene law, and Columbia offered the first university course for dental hygiene training. The dental hygiene movement spread rapidly throughout the country; in 1951 the last two states, Texas and New Mexico, ratified its practice.

Fones lived to see several thousand dental hygienists licensed to practice in 34 states, graduating from 20 schools of dental hygiene. He also saw the project approved and adopted by the American Dental Association and the U.S. Public Health Service.

Fones believed that dental hygienists could accomplish their greatest good by teaching oral hygiene in the schools. Many of his early graduates were employed in the schools of Bridgeport, where he supervised a strong oral hygiene service for the public school children.



### **Caries etiology and control**

#### **Fluoridation wins in court**

John P. Desmond. *J. Wisconsin D. Soc.* 31:255-256 Dec. 1955

The fluoridation of public water systems as a lawful means of combating dental caries won a clear victory recently in the Wisconsin Supreme Court's disposition of *Froncek v. Milwaukee*. The case

arose when a group of citizens representing various interests challenged the legality of Milwaukee's fluoridation ordinance. The citizens' group argued that:

1. Caries is a private health problem, not a proper subject for public health legislation.

2. The city unlawfully had invaded the private practice of dentistry, medicine and pharmacy.

3. The city had infringed fundamental rights of citizens, including the right to be free from medical experimentation, the right to treat one's health as one deems best, the right to freedom of religion, the right of parents to bring up their children as they deem best, and the right of property, specifically the right to the same type and quality of water in one's plumbing system as was available when it was first installed.

The court rejected each of these arguments. It held that caries is a public health problem and a proper subject for public health legislation, though conceding that it was also a private problem.

The court observed that fluoridation is most beneficial for combating caries in young children and that "... the protection thus given will continue well into adult life. . . . Children of today are adult citizens of tomorrow, upon whose shoulders will fall the responsibilities and duties of maintaining our government and society. Any legislation, therefore, which will better equip them, by retarding or reducing the prevalence of disease, is of great importance and beneficial to all citizens. In our opinion the legislation does bear a reasonable relation to public health."

The above language, quoted by Wisconsin's Chief Justice from the earlier opinion of a Louisiana court, justifies preventive medicine and dentistry under public auspices on a broad scale, at least where children are involved. Having decided the key issue in favor of fluoridation, the court had little difficulty with the other issues raised by the citizens' group.

In the *Froncek* case the scientific evidence made the burden of the citizens' group overwhelming; the group would have had to prove that the scientific evidence was incredible and impossible for reasonable minds to entertain. After the *Froncek* case, the opponents of fluoridation should expect no success in Wisconsin until they first battle successfully on the scientific front.

# **The combination, iron and sugars, in relation to dental caries**

(Kombinationen järn-socker i förhållande till tandkaries)

P. Torell. *Svensk tandläk.tskr.* 48:249-258 Sept. 1955

In previous reports the author has shown that solutions containing certain ferric salts were capable of destroying enamel. It was also shown that an initial concentration of ferric salts in saliva resulting in a pH value of 4 was required to cause damage to the enamel. Such conditions occur when certain liquid iron medications are used but one would not expect to find a high enough iron content in usable drinking water to cause a similar effect. Klein, however, reported a higher caries incidence in areas where the water contained "acid" iron and no fluoride than in areas where the water contained neither iron nor fluorides. Several reports show that sugar is caries activating (Kunert, 1901; Hentze, 1925; Easlick, 1948; Vipeholm studies 1947-1951; "Sugar and Dental Caries," J.A.D.A., 1953). It was decided, therefore, to study the possible connection between the effects of iron and sugar.

Strong chemical bonds exist in neutral mediums between sucrose and trivalent iron (ferric ion). A specially devised method based on the rate of diffusion of radioactive phosphate ions through ferric hydroxide-ferric phosphate gels, was used to study the adsorption of sucrose and phosphate ions to these gels. It was found that the gels absorbed sucrose at pH 7.5 to 6.5, thus decreasing the adsorption of phosphate ions. This indicates that ferric hydroxide-ferric phosphate gels precipitated on enamel surfaces can absorb sugar dissolved in neutral saliva. Oral intake of ferric iron in a form permitting hydrolysis makes the "smooth surfaces" more vulnerable to dental caries if frequent intake of sugar is involved.

For fissure caries this sugar adsorption mechanism is considered to be of slight significance as compared to the effect of food impaction. Here sugar is permitted to act on enamel in larger amounts and for longer periods. The possible combined effect of iron and sugars in such cases was studied using sodium acetate buffers, pH 3.8, containing varying amounts of sugars and iron salts. When enamel samples were incubated in



these buffers it was shown that a suitable proportionality between iron and reducing sugars increased the acid resistance of the enamel, in the absence of iron complex-forming agents.

The results emphasize the importance of a rigid control of the salt mixtures used in purified caries-conducive diets for experimental animals. An addition of iron to a diet containing large amounts of sugars may decrease the cariogenic effect of the diet.—G. Ryge

### Is there a case against fluoridation?

Gerald J. Cox. *J. Missouri D.A.* 35:8-16  
Nov. 1955

Arguments against fluoridation are those of a political, economical, chemical, dental, logical, statistical and cultist nature.

It is contended that fluoridation is an invasion of human rights; with equal force and better logic it can be asserted that it is an invasion of human rights to compel the continued use of a water known to be defective in an easily added constituent. Fluoridation cannot be equated with medication. The former is the provision of a nutrient substance for building caries-resistant enamel of teeth which have not yet been formed or erupted and have not yet decayed. Medication is a process of treating an illness with various substances with the purpose of restoring the affected parts to normal health.

Those who argue that fluoridation is wasteful seem to be interested in saving fluorides; the object is to save teeth. This latter is done at a cost of about 10 cents per capita per year or \$7 for the proverbial lifetime. It is estimated that for every dollar spent in fluoridation, \$40 in the cost of dental services may be saved.

Opponents of fluoridation commit several errors in the field of chemistry. They confuse the fluorine compounds used in fluoridation of water with elementary fluorine; they equate fluoridation with chlorination of water; they assert that the fluoride occurring naturally in water differs from that added in fluoridation; that the other ions of water exert great influence on the fluoride ion; that when water is boiled, the fluoride is concentrated; that fluoride robs the body of cal-

cium; that fluoride is not an essential element; that fluoridation affects adversely the taste of water, and that fluoride will concentrate in the ends of pipes.

Opponents argue fallaciously that fluorides will injure the brain, kidneys, heart and circulatory system, and will lead to goiter, abortions and stillbirths. None of these assertions is true.

The opponents of fluoridation will not meet the challenge of quantity. For example, Charles T. Betts will exhibit a bottle of sodium fluoride plainly labeled "poison." He will challenge anyone to take a teaspoonful. But he will not tell his audience that to take it in the form of water containing 1 ppm of fluoride would require the simultaneous ingestion of about ten barrels of water.

The cultists who oppose fluoridation have no scientific authority. When their "researches" are examined, one finds no analyses being done, and if fluorides are used in studies, they are in amounts far in excess of those in water fluoridation. Their findings are imaginary.

The answer to the question, Is there a case against fluoridation? is that there is no valid reason of any kind yet produced against this assured method of building dental enamel to resist the initiation of the carious processes.

### An appreciation of the Vipeholm study of dental caries

G. N. Davies. *New Zealand D.J.*  
51:153-157 Oct. 1955

The Royal Medical Board of Sweden in 1945 established a dental research station at the Vipeholm Hospital at Lund, to investigate the relation between diet and dental disease. Up to the end of 1951, approximately \$137,200 had been granted the research station. It was felt that "if the observations and conclusions in the investigation should result in a decrease of caries activity in Sweden by 0.5 per cent, for one year only, it would be enough to compensate the costs for the entire investigation."

Vipeholm Hospital is an institution for the care of some 960 mentally defective patients from all parts of Sweden. Included in the study were 355



males who were divided into one control and six experimental groups, each group consuming a different diet. The following conclusions were reached:

1. When sugar is consumed at meals in quantities up to twice the average per capita consumption, no pronounced increase in caries activity results.
2. The consumption of sugar in a sticky form at meals increases the rate at which new lesions develop.
3. The greatest increase in the number of new lesions results from the frequent consumption between meals of sugar in a sticky form.
4. A high caries activity brought about by the consumption of sugar in a sticky form between meals is greatly reduced by withdrawing these foods from the diet.
5. In a small number of patients new cavities may still appear even when the sugar and total dietary carbohydrates are reduced to a minimum.

The Vipeholm study is important because it was possible to undertake a longitudinal dietary and clinical study of the same patients under well-controlled conditions for a long period. The results show clearly that in evaluating the effect of the intake of sugar on dental caries, it is not only the quantity of sugar consumed that is important but also the form in which it is served and the frequency with which it is consumed.

#### **Topical application of sodium fluoride to the teeth**

Francis A. Bull. *Health* 13:10-12 Jan. 1956

After the favorable reports on the action of fluorides in drinking water in reducing the incidence of dental decay, John Knutson, of the U.S. Public Health Service, set up a research project to ascertain whether a fluoride solution applied directly to the enamel of children's teeth would reduce the incidence of dental decay. Knutson used a 2 per cent solution of sodium fluoride. First a prophylaxis was given, then the teeth were carefully examined and charted for existing dental caries. The teeth were dried and the sodium fluoride solution applied and allowed to remain in

contact with the teeth for four minutes on only one side of the mouth. The other side of the mouth was not treated and was used as a control. This procedure was repeated until each child had four separate treatments on the teeth on one side of the mouth.

At the end of one, two and three year periods, a comparison of the amount of dental decay in the teeth on the treated and untreated sides of the mouth was made. Knutson reported a 40 per cent reduction in the incidence of dental decay for the teeth treated with the fluoride solution as compared to the untreated teeth in the same child. His recommendations were that a series of sodium fluoride treatments should be given at 3, 7, 10 and 13 years of age so that all teeth would be treated shortly after they had erupted.

The Wisconsin State Board of Health, in cooperation with the fluorine study committee of the Wisconsin State Dental Society, set up a program to test the caries-inhibiting properties of topically applied sodium fluoride. In Calumet and Ozaukee counties, 631 three year old children were treated. When they reached kindergarten age (five to six years), they had a def rate of 3.36, a rate 30 per cent below the def rate of 4.78 for the control group of untreated children. In addition, 912 seven year old children were treated. When they reached the age of ten, they had a DMF rate of 3.48, a 24 per cent improvement over the DMF of 4.50 for the untreated control group at this age. Of the ten year old children, 735 were treated; at 13 years of age they showed a DMF of 7.2. The control group at this age level had a DMF rate of 8.63.

Although the 30 per cent reduction in the incidence of dental decay found in the deciduous teeth of the kindergarten group represented a substantial improvement, the percentage of reduction found in the permanent teeth of the other age groups was disappointing. Considering the time and expense involved in carrying out this program of topical application of sodium fluoride, the reduction in dental decay achieved would not justify similar programs. The topical application of sodium fluoride, however, can be carried out in the family dentist's office as a routine procedure while dental health care is being administered, for those children who have not had the benefits of fluoridated drinking water.

### Study of children drinking fluoridated and nonfluoridated water

Edward R. Schlesinger, David E. Overton and Helen C. Chase. *J.A.M.A.* 160:21-24 Jan. 7, 1956

As part of the Newburgh-Kingston Caries-Fluorine Study, approximately 900 children are being studied closely over a period of ten years for possible systemic effects of drinking fluoridated water. Comparison is made of the findings from pediatric examinations, measurement of height and weight, roentgenograms of the wrists and knees, blood cell counts and special ophthalmologic and otologic examinations. No significant deviations in any of the factors studied have been found in the group of Newburgh children ingesting fluoridated water as compared with the Kingston control group.

Routine urine analyses, including testing for albumin and sugar and examination of the centrifuged sediment, have been made as part of the Newburgh-Kingston study. A more refined method was considered desirable, however, in view of published reports of gross pathologic changes in the kidneys of experimental animals after the prolonged administration of highly toxic levels of fluoride several hundredfold greater per unit of body weight than the level used in water fluoridation.

A special study was made of the quantitative excretion of albumin, red blood cells and casts in 12 hour urine specimens in a group of 100 boys, aged 12 years to their nearest birthday, selected in each of the two cities. The collection and examination of urine specimens followed the Addis method as modified by Lippman. No limitation was placed on the boys' physical activity prior to collection of the 12 hour specimens. The results are presented tabularly.

The mean of the albumin determinations in the Kingston specimens was 34.1 mg., with a standard deviation of 12.9 mg. The corresponding mean and standard deviation for Newburgh was 29.0 mg. and 13.4 mg., respectively. The average number of red blood cells excreted in the Kingston specimens was 14,700 and in the Newburgh specimens, 10,300. In the Kingston group, 60 per cent of the specimens showed a red blood cell

count under 20,000 and in the Newburgh group this was true of 78 per cent. The average number of casts in the Kingston specimens was 2,800 and in the Newburgh specimens, 1,900. In the Kingston group, no casts were found in 56 per cent of the specimens, and in the Newburgh group no casts were found in 68 per cent of the specimens.

The differences found in the results from the groups in the two cities tended to be favorable to the Newburgh children. No medical significance can be attributed to any of the differences. This study adds further weight to the mass of evidence that points to the safety of water fluoridation as a public health measure for the prevention of dental caries.

### Investigation of salivary oxidation-reduction potential in caries-resistant and caries-active persons (Undersøgelse af spytets redoxpotential hos kariesresistente og kariesaktive forsøgspersoner)

H. Eggers Lura. *Odont.Tskr.* 63:413-435 Oct. 1955

In human saliva both reducing and oxidizing agents are found. They form the so-called redox systems, the electron activity of which may be measured by redox indications or by electrometric methods, as are measurements of pH values. Whereas the pH value is an expression for the acid-base equilibrium—characterized by dissociation or binding of the protons (positive electric unit), the redox value is an expression for the reduction-oxidation balance, characterized by dissociation or binding of the electron (negative electric unit).

Colorimetric and electrometric redox measurements were made on patients between 5 and 16 years of age, classified as follows: (1) caries resistant or caries free, (2) questionable caries resistant, (3) caries active and (4) questionable caries active.

By  $E^h$  measurements in open vessels with platinum and calomel electrodes, a stable potential is found which may be used to characterize the single salivary types. The mean  $E^h$  value of the

caries-resistant type was found to be  $+309 \pm 4.7$  millivolts and of the caries-active type  $+237 \pm 9.9$  millivolts. The differences between the two groups are significant.

The saliva from the caries-resistant group seemed to be saturated with oxygen, as pure oxygen, when passed through the saliva, did not raise the potential to any remarkable degree. The addition of hydrogen peroxide, on the contrary, caused a rapid rise of the salivary potential because of the presence of salivary peroxidase and catalase. Substances activating the oxidizing processes of the salivary microflora—like cytochrome, adenosine triphosphate and diphosphopyridine—will also raise the potential.

Differences of the potentials of the two groups may be caused by the following: (1) differences of the content of oxidizing enzymes; (2) differences of the content of biologic oxidation-reduction systems and (3) differences of the oxidation-reduction potentials caused by different microflora.

The aerobic or anaerobic conditions of a medium influence the oxidation-reduction potential of the bacteria. The flora of the caries-resistant salivas is predominated by the streptococci, the staphylococci, the micrococci, the corynebacteria and the neisseria. The aerobic character and the formation of hydrogen peroxide of this flora may account for the more positive potential of such saliva.

In caries-active saliva are found more anaerobic or facultatively anaerobic strains like the lactobacilli and the enterococci, and these strains have more reducing properties, causing a more negative potential.—G. Ryge

#### **Differences between caries-susceptible and caries-resistant teeth**

(Nekteré rozdily mezi snacne kazivym a snacne odolnym chrupem)

J. Novotny. *Česk.stomat.* 2:48-53 1955

At the Dental Institute of the University of Prague, Czechoslovakia, an average group of the Czech population (about 100 men, women and children) recently was examined to establish the

degree of susceptibility or resistance to dental caries. Previously, extensive studies on caries had been made with experimental animals.

Local predisposing factors were established such as defects in enamel, pits and fissures caused by embryonal imperfections in development and faults in formation, position and occlusion. In teeth susceptible to caries, the following causative or influential factors were observed: the presence of bacteria in the oral cavity which produce acid and are able to survive in acid substances; the capacity of the bacteria to produce enzymes for degradation of sugar to acid; the presence of fermentable carbohydrates in bacterial plaques adherent to tooth surfaces.

A few of the persons examined were found to have teeth resistant to caries. The chemical reaction in persons who were almost caries immune differs greatly from those of caries-susceptible patients.

Of the various microorganisms constantly present in the oral cavity, the different types of lactobacilli were established as the partial cause of caries. Proteolytic bacteria, such as various types of streptococci, play no part or only a minor one in caries. High lactobacillus counts always are indicative of high susceptibility to caries. Human saliva, however, contributes little to the carious process. The enzymes originate in oral bacteria, especially in nonmigratory microorganisms of the bacterial plaques. Without enzymes, decalcification cannot occur.

Dental plaques form rapidly, and cannot be dislocated by ordinary cleaning with a toothbrush. Caries develops below these plaques which usually are formed by feltlike networks of bacteria such as actinomyces, leptothrix, oidiomycetes and candida. The filamentous plaques, however, mainly contain lactobacilli.

Persons who are extremely susceptible to caries often show a definite tendency to mental and psychic disorders.

The diet of caries-susceptible persons contains an excessive amount of sugar and other carbohydrates. Some persons resistant to caries, however, consume the same diet.

Oral hygiene usually is better in the caries-resistant group than in the caries-susceptible group. Paradoxically, oral hygiene also is excellent in persons with a high degree of caries frequency.

## Epidemiology

### Maps, medicine and disease

G. Mann. *Science Digest* 19:75-79 Dec. 1955

Certain diseases, after appearing in one geographic area, avoid surrounding regions, and recur in more remote countries. Some diseases follow the banks of rivers or the edges of forests; others are influenced by climate, including temperature and rainfall.

In certain unhealthy villages in Ecuador's province of Loja, where malaria and typhoid flourish, heart disease is almost unknown. Yet cardiac diseases are frequent in an essentially similar community only 40 miles away.

Arizona has a traditionally high death rate from tuberculosis, but many tuberculosis victims seek the Arizona climate, thinking it beneficial.

The beginnings of medical geography are hard to trace. As early as the eighteenth century, meticulous records of diseases were registered as they appeared in areas as far apart as Jamaica and Plymouth, England.

In the nineteenth century, as the white man moved into the tropics and met a host of new diseases, medical geography received a new impetus. Another stimulus came from World Wars I and II, where extended combat lines posed new problems for military physicians. The German *Wehrmacht* was aided by accurate maps of diseases, with an emphasis on those of the Mediterranean area and the trans-Caspian region of Russia.

In instances of viruses, temperature, humidity, the earth's electromagnetic field and the abundance of ultraviolet radiation require mapping. Nutritional diseases are simpler to map, because it is easy to register where lack of an essential food item (or lack of food in general) will cause such diseases. Those maps will register not only regions where beriberi and pellagra appear but also the iodine-poor goiter-ridden regions of the upper Midwest in the United States.

The geography of poliomyelitis reveals that the European outbreaks are heaviest in Scandinavia; in the United States, this disease is more severe in the northern states. In such relatively backward areas as India and China, poliomyelitis lags far behind other diseases in severity.

There is a relationship between the incidence of leprosy and warm, humid climates and dense populations. Leprosy appears, however, in northern Europe, the Balkans and in Spain. In Haiti, leprosy is mapped in relation to altitude, temperature and rainfall.

A few years ago, James M. Dunning mapped the pattern of tooth decay in the United States. His observations indicate that the farther north, and the farther from the seacoast, the greater the frequency of tooth decay. From Texas through the Midwest, the frequency of tooth decay increases until the Dakotas are reached. The colder the climate, the more carbohydrates are consumed—and starchy and sugary foods encourage dental caries. Wells far from the coast usually are deeper, with a higher fluoride content in drinking water.

Like many problems in medical geography, facts on cancer pose more problems than they answer, but lead to new approaches to that and other diseases. As A. Symeonidis once remarked about cancer, "Before we can find the why, we must find the where." This idea typifies the approach of the medical geographer.

**Orthodontics and pedodontics****Orthodontics****Orthodontic methods  
based on tissue reaction**

Kaare Reitan, Oslo, Norway. *Tschr.tandheelk.*  
62:666-675 Oct. 1955

In orthodontics, the term tissue reaction designates changes caused by irregular tooth movements that occur in periodontal structures. This term, however, can also be applied to the reaction in the jaw mechanism and alveolar structure to changes in tooth position. Tissue reaction, in a broader sense, includes an evaluation of possible injurious effects appearing in supporting structures, years after treatment, when the teeth had not moved into a balanced occlusion and articulation.

In orthodontic practice, patients should be divided into two groups: (1) children from 7 to 9 years old with only permanent anterior teeth erupted, and (2) juveniles and adults with all or nearly all permanent teeth erupted.

Early extraction of deciduous teeth as advocated by Hays Nance (1947) and Kjellgren

(1948), and others now is generally accepted. Removal of deciduous cuspids is a logical procedure to obtain early alignment of permanent anterior teeth.

The fibrous system of the cortical plate consists of collagenous fibers which have a tendency to rearrange themselves when displaced. This reaction is especially pronounced when the dental arch is expanded and less observable after intrusion or extrusion of the teeth.

Also, the periosteal fibers connecting the alveolus with the free gingiva are liable to be displaced during tooth movement. Teeth may rotate 90 degrees. A stretching of the periosteal fibers occurs which can be observed even at a considerable distance from the tooth moved. A similar stretching takes place around the alveolar crest when the dental arch is expanded. The tendency of the fibrous system to rearrange itself is a natural and biologic reaction. This reaction explains why the dental arch can be expanded only to a certain degree.

After an extended expansion the tendency of the arch to return to its former position can persist for years. The dental arch can be expanded by from 2 to 3 mm. without danger of its returning to its previous position, depending on the muscular balance and on the position of the third molars.

In many instances, a comparison of the arch length with the linear dimension of the diameters of the teeth will be a valuable guide. This method, however, does not solve the problem as to whether the teeth could or should be extracted.

The following diagnostic points should be considered before extractions: (1) the muscular function of tongue, cheeks and lips; (2) the pa-

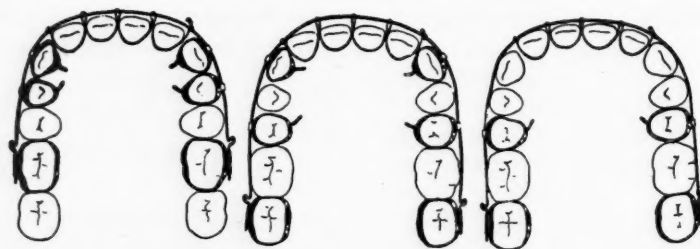


Figure 1 Sectional arches connect second molars to second bicuspid; first molars and first bicuspid are connected with elastic bands



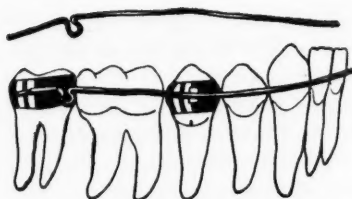


Figure 2 Correction of Spee's curve



Figure 3 Elimination of cross-bite in the molar region

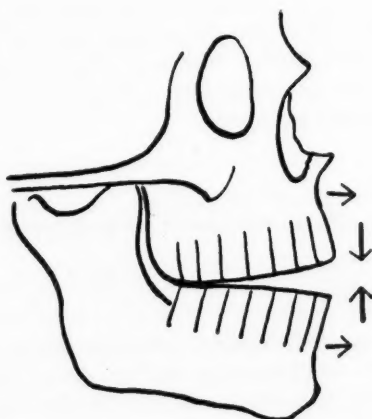


Figure 4 Anterior teeth causing widening of the apical base region when moved occlusally

tient's habits and posture; (3) hereditary developmental tendencies and delayed occlusion (both contraindicate early extractions), and (4) the shape, size and position of each tooth.

If lower teeth must be extracted, it is often necessary to remove the corresponding upper teeth.

To determine the space required and to compare it with the space available, the length of the dental arch should be compared with the mesiodistal diameter of the teeth. The developmental pattern of both jaws also should be considered.

The technic of measuring the Frankfort mandibular plane in young patients has often been criticized; however, it has value.

The extraction of teeth is related to the reaction of structures during orthodontic treatment. The position of the third molars often constitutes a determining factor, especially in borderline instances.

Certain types of tooth movement in patients 14 years of age or older require additional orthodontic treatment with fixed appliances, as for example for (1) correction of Spee's curve; (2) immediate correction of cross-bite; (3) closure of spaces after extraction in the mandible; (4) correction of the axial position of the teeth, and (5) correction of open bite.

A combination of removable and fixed appliances may be used in the correction of cross-bite in the molar region. Usually, orthodontic therapy consists of the insertion of activators; a cross-bite in the molar region (unilateral or bilateral) can be corrected by sectional arches.

The movement of deciduous molars (or of molars in older patients) often is difficult to achieve with plate or sectional arches. In order to move a tooth such a distance, the supporting fibers must be held under tension for a long period. It is logical to add a light continuous force to the force of the activator.

Although many patients can be treated with removable activators, it is necessary often to combine various orthodontic methods.

Hays Nance wrote some years ago: "It is my feeling that orthodontic treatment is beneficial only in the results it produces." This statement holds true today.

**Included upper central incisor:  
surgical and orthodontic treatment**

(Central superior incluído, su tratamiento quirúrgico y ortodóncico [Caso clínico])

L. Cobos Segovia, J. Colin M., E. Manns, C. Sáinz and A. Espino. *Rev.dent.Chile* 45:657-662 May-June 1955

A girl, 11 years old, was referred for surgical treatment with a clinical and roentgenographic diagnosis of inclusion of the upper right central incisor and an odontoma anterior to the tooth. The space which corresponded to the tooth in the dental arch was much smaller than the crown of the upper left central incisor. The occlusion of the upper dental arch with the normal lower arch was imperfect. A small painless tumor, the size of a pea, was visible and palpable in the region of the alveolar bone covering the included tooth. Surgical removal of the tumor and orthodontic treatment after the operation were planned.

The operation was performed on June 30, 1953, under procaine anesthesia. Extirpation of the tumor made it necessary to resect about 1 sq. cm. of alveolar bone from the region of the tumor. The membrane of the tumor was opened and a large amount of calcific material eliminated. All of the tumor was removed and the cavity thoroughly cleansed. At the conclusion of the operation, the incisal edge of the crown of the unerupted tooth was disclosed deeply embedded in the bone under the base of the nose. The cavity was surgically dressed, protected with surgical cement and left untouched for two months, after which time the dressing was removed and changed every few days for the following two weeks. On August 28, the cavity was entirely epithelized. The incisal edge of the unerupted tooth was in the same position as before.

The patient was referred for orthodontic treatment, which was given for about 12 months. An impression of the coronal third of the distal tooth was taken in impression compound. A casting ferrule was made from the impression, soldered vestibularly to a small ring, and cemented, through the opening, to the incisal edge of the crown of the unerupted tooth. An orthopedic appliance was placed on October 13, and was used for about 12 months. It consisted of a smooth steel wire arch which had springs, in the form

of a U, soldered to the distal cuspids. Sufficient space in the upper dental arch for the unerupted tooth was obtained.

Roentgenograms taken on March 12, 1954, showed favorable outward progression of the unerupted tooth. On that date a horizontal spring was soldered to the arch so as to guide the eruption of the upper right central incisor.

On May 14, 1954, the ferrule which was interfering with proper occlusion and with the settling of the tooth in the dental arch, was removed from the tooth. A Jackson steel band was placed on the incisor and joined to the arch by a ligature. The apparatus was then left inactive for several months.

Roentgenographic examination showed a normal apex of the tooth and formation of alveolar bone. Direction of the tooth was corrected and further eruption encouraged in order to prevent occlusal disharmony. The orthopedic appliance and bands were removed at the end of one year. A retaining apparatus, which consisted of Jackson bands soldered to a segment of an arch, was applied to the upper central incisors and the right lateral incisor. Roentgenographic examination on December 16, 1954, showed formation of alveolar bone and normal apex and normal periodontium of the tooth.

The retaining appliance was used for about one year, and the patient was observed every month during this period. The results of this orthodontic treatment were excellent. The patient has a complete upper dental arch and occlusion is normal. It is presumed that the odontoma may have retained the tooth and prevented its outward progression.

**The Burlington orthodontic research centre**

Frank Popovich. *J.Canad.D.A.* 22:13-14 Jan. 1956

An orthodontic research center, the first of its kind in North America, was established three years ago in Burlington, Ontario. The Burlington Lions Club provided the initial office space. The project is financed by a grant-in-aid through the Federal Department of Health and Welfare and a portion through the division of dental research,

University of Toronto. The staff at the center includes a geneticist, three orthodontists, two pedodontists and a secretary (all on a part-time basis), and a full-time orthodontist and technician.

The objectives of the project are as follows: (1) to evaluate the application of interceptive orthodontic procedures on a serial basis beginning at three years of age; (2) to analyze and define the characteristics of normal and abnormal occlusion; (3) to assess the role of inheritance in determining significant characteristics of cranial and facial growth, and (4) to build up a library of data for future studies.

A serial study is being carried out on a group of 320 three year old children. For each three year old child a complete set of records is taken annually, including a case history, a clinical examination to assess growth and occlusion, six cephalometric roentgenograms, one wrist roentgenogram, impressions and wax bite for dental casts, periapical films (where necessary), height and weight records, and electromyographic records. Any child found with an indication of an irregularity in oral development is recalled at a suitable time for treatment.

Nine hundred children of the ages 6, 8, 10 and 12 years are used as a cross-section control sample. These children are seen only once, at which time a complete set of records is taken.

Today, three years after the project was initiated, 1,700 sets of records have been taken and 75 children are undergoing treatment. A number of research papers have been completed, and a number of problems are being investigated.

#### **Acrylic incline plane**

J. J. Schacter. *J. Canad. D.A.* 22:137-141  
March 1956

The lingually displaced maxillary incisor is a condition frequently observed in children after the permanent incisors have erupted. This condition should be corrected as early as possible, and can be corrected easily by the use of an acrylic incline plane.

The most common cause of this lingual occlusion is the prolonged retention of the deciduous teeth. The lingually displaced maxillary teeth are

unsightly and have a negative psychological effect. Abnormal pressure against the lower anterior teeth can cause severe gingival inflammation with rapid recession of the supporting labial plate. Freedom of movement of the mandible is impaired. The mandible may be forced labially, with permanent ill effects. The condition is rarely self-correcting.

The most opportune time to effect correction is during the eruption of the tooth, when the correction can be accomplished by finger pressure or by the use of a tongue depressor or paddle. If the tooth is locked when first seen, it should be corrected as soon as possible by means of an appliance.

Roentgenograms will reveal any causes at the root area, which must be eliminated prior to commencement of treatment. Models should be made and kept as a permanent record. They are useful in determining whether the space available is adequate, and in assessing the amount of movement and the difficulty that may be encountered during treatment.

The acrylic incline plane is a simple appliance which will correct one or more lingually malposed teeth. It may be made by the operator in a dental office with little effort. Self-curing acrylic resin, although not as strong as heat-treated acrylic resin, possesses adequate strength for the incline plane.

An impression of the lower mouth is taken and poured. One thickness of red wax is softened and pressed lightly over the surfaces of the teeth. No special effort is made to follow the contours of the various surfaces. The excess wax is trimmed to the gingival edges. Two additional pieces of wax are placed on the lingual surface from cuspid to cuspid for added strength.

The position of the malposed tooth is noted. The incline plane is placed by adding two thicknesses of wax from a base which extends to the centers of the adjacent teeth. It is inclined incisally and lingually at approximately 60 degrees. The pattern is removed from the model and tried in the mouth. Care must be taken to ensure that the posterior teeth will not come in contact until the tooth has been corrected. The angulation of the labial surfaces should be continuous with the lingual surfaces of the maxillary incisors. The incisal edge of the plane should not be wider than

the malposed tooth and should engage the incisal edge along the entire width at all times.

The wax pattern is then sealed on the model along the entire gingival margin. The surfaces are flamed smooth and the model is prepared for flasking and processing.

The appliance should "click" into place in the mouth with a minimum amount of fitting. The patient is instructed to wear the plane constantly, removing it only for cleaning after meals, and when the teeth are brushed.



#### Growth and development

##### **A fifth column within normal dental occlusions**

Murray L. Ballard. *Am.J.Orthodont.* 42:116-124  
Feb. 1956

Among the "subversive elements" which influence the normal growth and development of the human dentition and associated parts is the relative size of the six upper anterior teeth and the six lower anterior teeth. The relationship of the 12 anterior teeth was studied in 400 orthodontic patients. Sharply pointed dividers and a finely calibrated millimeter rule were used. The mesiodistal widths of the six upper teeth were totaled, as were the mesiodistal widths of the six lower teeth.

The head of the research department of a large manufacturer of artificial teeth has reported that "the combined mesiodistal widths of the lower six anterior teeth is 75 per cent of the combined widths of the upper six anterior teeth. This relationship gives an average overjet of 1.0 mm."

For the 400 patients, the combined total of the mesiodistal widths of the six upper anterior teeth was multiplied by 75 per cent. The figure obtained was considered as the so-called normal or ideal total of the mesiodistal widths of the lower six anterior teeth. Any variation in the totals was measured as a plus or minus. A plus value indicated that the combined total of the mesiodistal diameters of the lower six anterior teeth was

larger than the ideal total as determined by the mathematical formula. Calculations were made on the anterior teeth of 400 orthodontic patients, with the following results:

31 (7.75 per cent) had a minus variation.

6 (1.50 per cent) were normal.

363 (90.7 per cent) had a plus variation.

323 (80.7 per cent) had a plus variation of 1 mm. or more.

212 (50.3 per cent) had a plus variation of 2 mm. or more.

126 (31.5 per cent) had a plus variation of 3 mm. or more.

53 (13.2 per cent) had a plus variation of 4 mm. or more.

15 (3.75 per cent) had a plus variation of 5 mm. or more.

That in 50.30 per cent of patients plus variations of 2 mm. or more were found cannot be ignored. This means that, on an average, one of every two orthodontic patients has an excess of tooth structure in the mesiodistal widths of the lower six anterior teeth in excess of 2 mm.

This variation in tooth size and the relationship of upper and lower anterior segments are of sufficient incidence and magnitude to merit serious consideration in the etiology, diagnosis and treatment planning for every orthodontic patient. The human denture is not the ideally perfect mechanism, as thought by early orthodontists.



#### Pedodontics

##### **An activator for the infant's jaws** (Aktivator für den Säuglingskiefer)

Th. Schuchardt. *Zahnärztl.Praxis* 7:6  
Feb. 19, 1956

The vertical growth of the lower jaw, the latitudinal extension of the upper jaw and the development of the maxillary sinus (antrum of Highmore) depend on the trophic stimuli exerted by masticatory function. The importance of these stimuli often are neglected. The results of such neglect are observable in many infants.

Years ago, parents tried to make the eruption of deciduous teeth less painful by giving the baby orrisroot to chew. Physicians and dentists, however, correctly opposed the insertion of such roots because it was difficult to keep the orrisroots in hygienic condition, and intestinal affections frequently occurred.

A puppy nibbles on everything, from shoes to furniture legs, and it can be observed that in about two months, the puppy's mouth has gained in length and strength. Such a rapid development can be caused only by his normal intensive masticatory function.

To replace the function of obsolete orrisroots, an activator, specially designed for the infant's jaws, has been introduced. This instrument consists of a rubber stick with a rubber ball on one end and a rubber ring on the other. Such an activator can be given to the baby safely, either in his hands or fastened to the crib or baby carriage. All infants like this new toy, play with it and nibble on it untiringly.

Thumbs and pacifiers, which some parents put into the baby's mouth to keep him quiet, do not exert the desired stimuli. Both are harmful, especially after the first teeth have erupted. Children usually are inclined to use thumbs or pacifiers for sucking purposes only and substitute the necessary masticatory function with the easily obtainable pleasure of sucking. Such a custom leads to habitual thumbsucking and to malformation of the forthcoming dentition and to deformation of the alveolar process.

### **Pedodontist and parents**

(Der Jugendzahnarzt und das Elternhaus)

W. Holzhauser. *Deut.Zahnärztebl.* 9:845-847  
Dec. 8, 1955

Success or failure in pedodontic therapy depends mainly on three factors: (1) the ability and experience of the pedodontist; (2) the cooperation between school authorities (and teachers) and the school dentists (or the free practicing pedodontists), and (3) the interest of the parents in the dental health and welfare of their children.

It can be assumed that all pedodontists combine their professional knowledge and responsi-

bility with idealism, kindness and understanding necessary to work with or on children. School authorities and teachers (probably with a few exceptions) do their utmost to promote and expedite the pedodontic program. The weak link in this chain is the attitude of the parents.

In instances in which children fail to attend scheduled periodic examinations or remain uncooperative or hostile during treatment, the pedodontist will try to consult the parents directly. In larger cities, such a contact will often be difficult or impossible to establish. Some of the pedodontist's words, when he attempts to influence his obstinate young patients, may reach the parents indirectly. Occasionally, a neighbor's remark will serve to awaken interest in the two sets of parents. These and other indirect contacts are but accidental attempts to throw light on the seriousness of the problem and to awaken the parents from a lethargic state which hinders if not prevents the treatment of their children.

A favorable opportunity to discuss freely the situation with parents occurs at meetings of parent-teacher associations (which recently have been established in several countries). Here, the pedodontist can discuss the various sides of the problem in words he cannot use with children because they could not understand their meanings. The disadvantage of such an attempt to reach the interest of negligent parents of obstinate children lies in the fact that the majority of these parents do not attend parent-teacher meetings. If they are not interested in their children's health, they usually are also not interested in their children's educational progress.

Although it is difficult to reach all parents, ways must be found to reach at least those parents whose children need immediate dental care and treatment. The pedodontist should mail a letter of information (or warning), describing the treatment indicated and the behavior of the child. He also should explain the situation to the dental practitioner who is acquainted or on intimate terms with the parents. This can be achieved best in the form of asking for advice.

Only a psychologically ingenious presentation of facts, an emphasis on the parents' responsibility toward dental health and behavior of their children and a stressing of the consequences of negligence, can lead to success.



# Doctoral and Masters' dissertations



*In this column each month are listed recent Doctoral and Masters' dissertations of dental interest, accepted by the dental schools or graduate schools in partial fulfillment for advanced degrees. Copies of many of these theses are available from the schools through interlibrary loan.*

Histological changes of the periodontium during various periods of retention following orthodontic movement of teeth. *Earl Dean Donaldson*. 1954. M.D.S. *University of Southern California*.

A study of the organization of the periodontal membrane fibers. *Thorwald Eros, Jr.* 1954. M.D.S. *University of Southern California*.

Full denture articulation. *Andrew T. Morstad*. 1955. M.S. *State University of Iowa*.

Fundamentals in exodontia. *Clarence Singsank*. 1954. M.S. *State University of Iowa*.

Root recovery. *Clement E. Staley*. 1955. M.S. *State University of Iowa*.

Operating room technique under general anesthesia. *Daniel E. Waite*. 1955. M.S. *State University of Iowa*.

Maintaining a dry field in operative dentistry. *John W. Wakely*. 1954. M.S. *State University of Iowa*.

Immediate denture surgery. *Robert M. Whiteside*. 1955. M.S. *State University of Iowa*.

Porcelain jacket veneer crown preparation. *Douglas H. Yock*. 1954. M.S. *State University of Iowa*.

Jaw relationship records. *Leo E. Young*. 1954. M.S. *State University of Iowa*.

A survey of the literature on "stresscoat" techniques in stress analysis. *Paul Reuben Koons*. 1955. M.S.C. *University of Kansas City*.

A survey of the literature on tooth plantation procedures in dentistry, with an evaluation of recorded cases and supplemental clinical and laboratory data. *Robert Honnold Marlette*. 1955. M.S.C. *University of Kansas City*.

An investigation of mandibular growth in the guinea pig by alizarin red S injections. *Vincent Joseph O'Shell*. 1955. M.S.C. *University of Kansas City*.

The reaction of abdominal connective tissue in rats to common dental restorative and base materials. *Thomas Dee Schaad*. 1955. M.S.C. *University of Kansas City*.

A study of the relation between nasal emission and the form and function of certain structures associated with nasopharyngeal closure in cleft palate individuals. *Alexander Wildman*. 1955. M.S.D. *Northwestern University*.

A histological and clinical study of the effects of calcium hydroxide methyl cellulose paste on pulps of young permanent teeth. *Frank H. Ludlam*. 1955. M.S.D. *Northwestern University*.

Blood culture investigations of hospitalized patients exhibiting gingival sepsis. *Francis Doherty*. 1953. D.D.Sc. *University of Melbourne, Australia*.

Neurotropisms of the upper alimentary tract. *Leighton Buckhurst West*. 1953. D.D.Sc. *University of Melbourne, Australia*.

Observations on the gingival condition of recently released prisoners-of-war. *Philip R. N. Sutton*. 1953. D.D.Sc. *University of Melbourne, Australia*.

The application of optics to dental practice. *Algermon Leigh Jones*. 1953. D.D.Sc. *University of Melbourne, Australia*.

Stabilization of complete dentures by use of permanent magnets. *Fritz Blümel*. 1953. DR.MED. DENT. *Martin Luther Universität, Halle, Germany*.

Grinding methods before construction of upper dentures: resilience of the mucous membrane. *Günther Listemann*. 1953. DR.MED.DENT. *Martin Luther Universität, Halle, Germany*.

Clinical experiences with the ring-shaped facing of pivots: Zelzer's pivot crown. *Helga Wittig*. 1953. DR.MED.DENT. *Martin Luther Universität, Halle, Germany*.

Piacryl SH as tooth filling material. *Gisela Höhne*. 1953. DR.MED.DENT. *Martin Luther Universität, Halle, Germany*.

Experimental investigations of the development of the incisors in rats (Experimentelle Untersuchungen über das Wachstum des Rattenschneidezahnes). *Norbert Bische*. 1953. DR.MED.DENT. *University of Mainz, Germany*.

Diagnosis of dental focal infections in regard to comparable data on blood sedimentation ratio after injection with the patient's own blood (Zur Diagnostik der dentogenen fokalen Infektion unter besonderer Berücksichtigung der vergleichenden Blutkörpernkenkungsgeschwindigkeit nach Eigenblutinjektionen). *Karl Heinz Luchs*. 1953. DR.MED.DENT. *University of Mainz, Germany*.

Disturbances in the flow of blood in periodontal diseases (Durchblutungsstörungen bei Parodontopathien). *Karlfried Gärner*. 1953. DR.MED.DENT. *University of Mainz, Germany*.

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Different types of cysts occurring in the oral cavity (Contributio all'argomento delle cisti con ottavi inclusi nella branca montante della mandibola). *Gianfranco Robustelli*. 1954. DR.MED. & CHIR.ODONT. *University of Padua, Italy*.

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The caries inhibiting action of sodium fluoride. *Gunnar Bergman*. 1953. ODONT.D. *Royal School of Dentistry, Stockholm, Sweden*.

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Dry thyroid extract and retardation in tooth eruption (La poudre de thyroïde déséchée et les retards de dentition). *F. Perkun*. 1953. DR.MED.DENT. *Institute of Dental Medicine, Geneva, Switzerland*.

Structure and innervation of the temporomandibular meniscus (Structure et innervation du ménisque temporo-mandibulaire). *G. Masson*. 1953. DR.MED.DENT. *Institute of Dental Medicine, Geneva, Switzerland*.

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